MEMBER

ARBED-ROLLED WIDE FLANGE BEAMS
40" STANDARD AND TAILOR-MADE SERIES

Third Edition

TRADE ARBED Canada Inc

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INTRODUCTION

The ARBED Group — 130 years ago, ARBED began its climb into the top ranks of the international steel industry . . .

Today, with mills in Luxembourg, West Germany, Belgium, Austria and Brazil we have a capacity approx. 15 million tons of steel annually making us the 3rd largest producer in Europe, 10th largest in the world.

This success is due to our strict standards of quality and service firmly founded on an extensive offering of both standard and derived sections. In fact, it's our ability to give you 'what you need' that makes ARBED unique. Right from the time ARBED rolled the very first wide flange beam in 1902, we've continued to provide an ever-increasing array of products, among them our rolled wide flange beams, 40″ standard and tailor-made series.

This impressive capability can only be outlined in this brochure indicating a sampling of thousands of possible sections available. You no longer are restricted to the standard range of wide flange beams but now also have the option of specifying ARBED rolled beams as an alternate to built up/welded sections, (Of course, ARBED does not produce welded sections, nor does it sell fabricated steel). The result? — Considerable cost savings and the possible additional benefit of reduced weight . . .

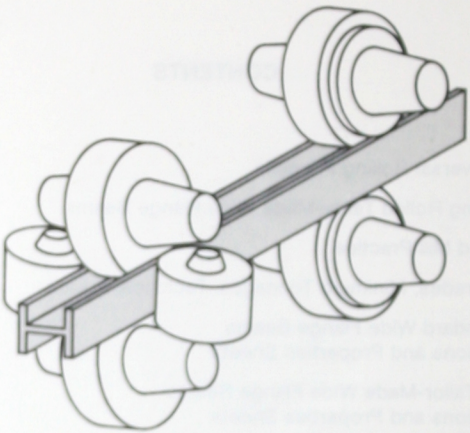
We invite you to investigate the steelworld of ARBED.

CONTENTS

THE UNIVERSAL ROLLING PRINCIPLE

The principle of 'universal' rolling which ARBED uses was developed by the Scotsman Henry Grey. The universal mill commissioned in ARBED's Differdange plant in 1902 was the first in the world to roll wide-flange beams of up to a meter height. Since then, the process has been constantly developed and improved by ARBED engineers and research staff.

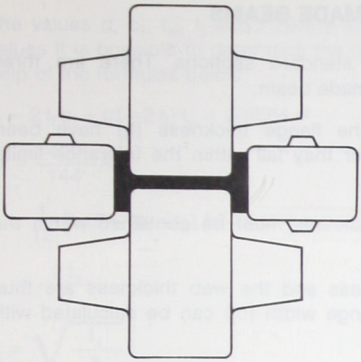
Today, beams are rolled on a powerful entirely new universal mill which caters to tailor-made beams just as much as to standard beams.



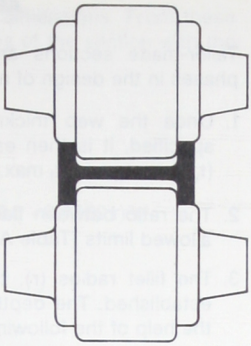
Schematic representation of a group of stands

The ingots are heated to rolling temperatures in pit furnaces before going through a special blooming process where they are pre-profiled. The pre-profiled bloom is rolled into a beam on the finishing train which comprises three groups of stands — cogging, intermediate and finishing (which is also used for polishing).

The first two groups are each comprised of a universal rolling stand and an edging stand. The two horizontal rolls in the universal stand roll the web. The vertical rolls of the universal stand roll the flanges. The two rolls in the edging stand simply edge the flanges.



A universal stand



An edging stand

The six rolls in each stand are adjustable. The universal stand with its downstream edger can roll a whole range of derived beams without any change in the roll set merely by use of the roll adjusting gear.

As there is no need to change rolls, standard and tailor-made beams can be produced in the same rolling. Tailor-made beams can therefore be supplied within the same delivery time as standard beams.

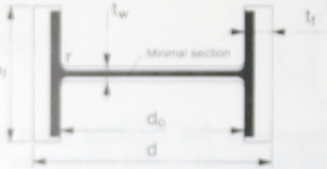
ARBED TAILOR-MADE BEAMS

Tailor-made sections are derived from standard sections. There are three phases in the design of an ARBED tailor-made beam:

1. Once the web thickness (t_w) and the flange thickness (t_f) have been specified, it is then established whether they fall within the tolerance limits (t_w max, t_w min, t_f max, t_f min) (Table A).

2. The ratio between flange and web thickness must be contained within the allowed limits (Table A).

3. The fillet radius (r), the flange thickness and the web thickness are thus established. The depth (d) and the flange width (b_f) can be calculated with the help of the following formulae



$$d = d_o + 2\,t_f$$

$$b_f = b_{fo} + t_w$$

Note that d_o is the distance between flanges and is determined by the width of the horizontal roll table, while b_{fo} is given by the size of the edging rolls (Table A).

TABLE A: DESIGN CRITERIA FOR TAILOR-MADE BEAMS

Designation	Distance between Flanges d_o in.	Width b_{fo} in.	Web Thickness t_w in.		Flange Thickness t_f in.		Flange/Web Ratio t_f/t_w		Fillet Radius r in.
			max.	min.	max.	min.	max.	min.	
WTM 40 × 18	36.53	16.900	1.330	0.710	2.000	0.830	2.0	1.5	1.180
WTM 40 × 16	36.53	14.900	2.360	0.650	3.540	0.830	2.2*	1.5	1.180
WTM 40 × 12	36.53	10.960	2.360	0.650	3.540	0.830	2.2*	1.5	1.180
WTM 36 × 16½	33.39	15.610	2.520	0.760	4.530	1.260	2.0	1.5	0.945
WTM 36 × 12	33.96	11.250	2.360	0.600	3.540	0.790	2.2*	1.5	0.752
WTM 33 × 15¾	31.38	14.940	2.360	0.715	3.540	1.150	2.0	1.5	0.709
WTM 33 × 11¾	31.38	10.835	2.360	0.550	3.540	0.740	2.2*	1.5	0.701
WTM 32 × 12	28.90	11.025	2.360	0.590	3.540	0.710	2.2**	1.5	1.181
WTM 30 × 15	28.30	14.230	2.360	0.655	3.540	1.065	2.0	1.5	0.669
WTM 30 × 10¾	28.30	9.830	2.360	0.520	3.540	0.670	2.0	1.5	0.650
WTM 28 × 12	25.04	11.040	2.360	0.570	3.540	0.670	2.2**	1.5	1.063
WTM 27 × 14	25.44	13.290	2.360	0.605	3.540	0.975	2.2**	1.5	0.591
WTM 27 × 10	25.44	9.400	2.360	0.460	3.540	0.640	2.0	1.5	0.598
WTM 26 × 12	23.15	11.080	2.360	0.530	3.540	0.630	2.2**	1.5	1.063
WTM 24 × 12¾	22.56	12.145	2.360	0.500	3.540	0.750	2.2**	1.5	0.512
WTM 24 × 12	21.26	11.100	2.350	0.510	3.520	0.610	2.3	1.5	1.063
WTM 24 × 9	22.56	8.450	2.100	0.415	3.150	0.585	2.0	1.5	0.500
WTM 22 × 12	19.37	11.120	2.100	0.490	3.150	0.590	2.3	1.5	1.063
WTM 22 × 8½	20.30	7.730	1.560	0.435	2.340	0.620	2.0	1.5	0.945
WTM 21 × 12¾	19.76	11.670	2.100	0.500	3.130	0.800	2.0	1.5	0.550
WTM 18 × 11	16.85	10.490	1.830	0.425	2.740	0.680	2.3	1.5	0.430

* for t_w less than 0.790, flange/web ratio shall not exceed 2

** for t_w less than 0.630, flange/web ratio shall not exceed 2

The values d, b_f, t_w, t_f and r define in full the section dimensions. From these values it is possible to determine the other caracteristics of the section with the help of the formulas below:

$$A = 2\,t_f\,b_f + (d - 2\,t_f)\,t_w + 0.8584\,r^2$$

$$W = \frac{490}{144}\,A$$

$$I_x = \frac{1}{12}\left[b_f d^3 - (b_f - t_w)\,(d - 2\,t_f)^3\right] + 0.03\,r^4 + 0.2146\,(d - 2\,t_f - 0.4468\,r)^2 r^2$$

$$S_x = \frac{2\,I_x}{d}$$

$$r_x = \sqrt{\frac{I_x}{A}}$$

$$I_y = \frac{1}{12}\left[2\,t_f\,b_f^3 + (d - 2\,t_f)\,t_w^3\right] + 0.03\,r^4 + 0.2146\,(t_w + 0.4468\,r)^2 r^2$$

$$S_y = \frac{2\,I_y}{b_f}$$

$$r_y = \sqrt{\frac{I_y}{A}}$$

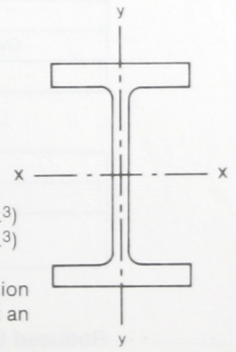
$$Z_x = \frac{A\,d}{2} - \left[b_f t_f^2 + t_w\,(d - 2t_f)\left(\frac{d}{2} - \frac{d - 2t_f}{4}\right) + 0.8584 r^2\,(t_f + 0.2234r)\right]$$

$$Z_y = \frac{b_f^2 t_f}{2} + \frac{t_w^2 (d - 2t_f)}{4} + 0.8584 r^2\left(\frac{t_w}{2} + 0{,}2234r\right)$$

$$J = \frac{2(b_f - 0.63t_f)}{3}\,t_f^3 + \frac{d - 2t_f}{3}\,t_w^3 + \frac{2t_w}{t_f}\left(0.145 + \frac{0.1r}{t_f}\right)\left(\frac{\left(r + \frac{t_w}{2}\right)^2 + (r + t_f)^2 - r^2}{2r + t_f}\right)^4$$

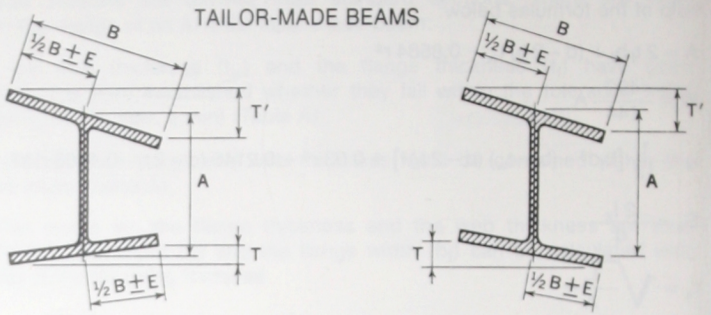
$$r_t = \sqrt{\frac{t_f b_f^3 + \frac{d - 2t_f}{6}\,t_w^3}{\frac{12}{\frac{A}{2} - t_w\frac{d - 2t_f}{3}}} + 0.0151 r^4 + 0.4292 r^2\left(\frac{t_w}{2} + 0{,}2234r\right)^2}$$

A Cross-sectional area (sq. in.)
W Weight (Lb./Ft.)
I_x Moment of inertia of a section about the X - X axis (in.^{4})
S_x Elastic section modulus about the X - X axis (in.^{3})
r_x Radius of gyration with respect to the X - X axis (in.)
I_y Moment of inertia of a section about the Y - Y axis (in.^{4})
S_y Elastic section modulus about the Y - Y axis (in.^{3})
r_y Radius of gyration with respect to the Y - Y axis (in.)
Z_x Plastic section modulus with respect to the X - X axis (in.^{3})
Z_y Plastic section modulus with respect to the Y - Y axis (in.^{3})
J Torsional constant (in.^{4})
r_T Radius of gyration of a section comprising the compression flange plus $^1/_3$ of the compression web area, taken about an axis in the plane of the web (in.)



STANDARD MILL PRACTICE

TAILOR-MADE BEAMS



ROLLING TOLERANCES

A, Depth, in.		B, Fig. Width, in.		T + T′. Flanges, Out of Square, max. in.	αE. Web off Center, max. in.
Over Theo-retical	Under Theo-retical	Over Theo-retical	Under Theo-retical		
3/16	3/16	5/16	3/16	5/16	1/4

α Variation of 5/16-in. max. for sections over 426 lb./ft.

CUTTING TOLERANCES

Variations from Specified Length, in.	
Over Theoretical	Under Theoretical
4	0

OTHER TOLERANCES

Variations in Area and Weight	
Over Theoretical	Under Theoretical
5.5 %	2.5 %

Variation in Straightness
Camber
$\frac{1}{8}$ in. × $\frac{\text{(total length, ft.)}}{7}$

Reduced tolerances are subject to negotiation.

MINIMUM TONNAGE

The minimum tonnage required for tailor-made sections which have dimensions exceeding those of ASTM-A6 is 50 tons. It is also possible to design and produce tailor-made sections which fall between two ASTM-A6 standard sections. In this case the minimum tonnage requirement is subject to negotiation.

The minimum tonnage requirements applicable to the 40″ standard beams is 5 tons.

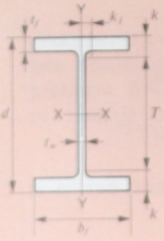
STEEL GRADES

40″ and tailor-made wide flange beams can be provided in accordance to the following ASTM grades:

A 36
A 441
A 572-42
A 572-50
A 572-60 (40″ standard sections only)
A 242
A 588

TECHNICAL ADVICE

Our team of engineers is available to assist with the specification and application of 40″ standard or tailor-made beams. ARBED computer programs are available for establishing the best tailor-made section on the basis of given static values, or for determing the static values of a derived section.



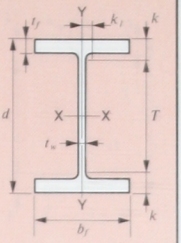
40" WIDE FLANGE BEAMS

Dimensions

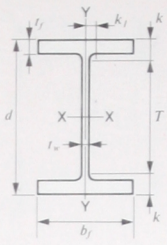
Designation	Area A	Depth d	Web			Flange				Distance			Compact Section Criteria			
			Thickness t_w		$\frac{t_w}{2}$	Width b_f		Thickness t_f		T	k	k_1	$\frac{b_f}{2t_f}$	F_y	$\frac{d}{t_w}$	
	In.²	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.		Ksi		
W 40X18 X328	96.4	40.00	40	0.910	15/16	1/2	17.910	17 7/8	1.730	1 3/4	33 3/4	3 1/8	1 11/16	5.2	-	44.0	3
298	87.6	39.69	39 3/4	0.830	13/16	7/16	17.830	17 7/8	1.575	1 9/16	33 3/4	3	1 5/8	5.7	-	47.8	2
268	78.8	39.37	39 3/8	0.750	3/4	3/8	17.750	17 3/4	1.415	1 7/16	33 3/4	2 13/16	1 9/16	6.3	-	52.5	2
244	71.7	39.06	39	0.710	11/16	3/8	17.710	17 3/4	1.260	1 1/4	33 3/4	2 5/8	1 9/16	7.0	-	55.0	2
221	64.8	38.67	38 5/8	0.710	11/16	3/8	17.710	17 3/4	1.065	1 1/16	33 3/4	2 7/16	1 9/16	8.3	61.1	54.5	2
192	56.5	38.20	38 1/4	0.710	11/16	3/8	17.710	17 3/4	0.830	13/16	33 3/4	2 1/4	1 9/16	10.7	37.1	53.8	2
W 40X16 X277	81.3	39.69	39 3/4	0.830	13/16	7/16	15.830	15 7/8	1.575	1 9/16	33 3/4	3	1 5/8	5.0	-	47.8	2
249	73.3	39.38	39 3/8	0.750	3/4	3/8	15.750	15 3/4	1.420	1 7/16	33 3/4	2 13/16	1 9/16	5.5	-	52.5	2
215	63.3	38.98	39	0.650	5/8	5/16	15.750	15 3/4	1.220	1 1/4	33 3/4	2 5/8	1 9/16	6.5	-	60.0	1
199	58.4	38.67	38 5/8	0.650	5/8	5/16	15.750	15 3/4	1.065	1 1/16	33 3/4	2 7/16	1 9/16	7.4	-	59.5	1
174	51.0	38.20	38 1/4	0.650	5/8	5/16	15.750	15 3/4	0.830	13/16	33 3/4	2 1/4	1 9/16	9.5	46.9	58.8	1
W 40X12 X235	68.9	39.69	39 3/4	0.830	13/16	7/16	11.890	11 7/8	1.575	1 9/16	33 3/4	3	1 5/8	3.8	-	47.8	2
211	62.0	39.37	39 3/8	0.750	3/4	3/8	11.810	11 3/4	1.415	1 7/16	33 3/4	2 13/16	1 9/16	4.2	-	52.5	2
183	53.7	38.98	39	0.650	5/8	5/16	11.810	11 3/4	1.220	1 1/4	33 3/4	2 5/8	1 9/16	4.8	-	60.0	1
167	49.1	38.59	38 5/8	0.650	5/8	5/16	11.810	11 3/4	1.025	1	33 3/4	2 7/16	1 9/16	5.8	-	59.4	1
149	43.8	38.20	38 1/4	0.630	5/8	5/16	11.810	11 3/4	0.830	13/16	33 3/4	2 1/4	1 1/2	7.1	-	60.6	1

40″ WIDE FLANGE BEAMS

Properties



Compact Section Criteria					r_T	$\frac{d}{A_f}$	Elastic-Properties						Torsional-constant J	Plastic Modulus	
							Axis X-X			Axis Y-Y					
$\frac{b_f}{2t_f}$	F_y'	$\frac{d}{t_w}$	F_y'''			I	S	r	I	S	r		Z_x	Z_y
	Ksi		Ksi	In.		In.^{4}	In.^{3}	In.	In.^{4}	In.^{3}	In.	In.^{4}	In.^{3}	In.^{3}
5.2	-	44.0	34.2	4.73	1.29	26800	1340	16.7	1660	185	4.15	74.2	1510	286
5.7	-	47.8	28.9	4.70	1.41	24200	1220	16.6	1490	167	4.12	56.3	1370	257
6.3	-	52.5	24.0	4.67	1.57	21500	1090	16.5	1320	149	4.09	41.1	1220	229
7.0	-	55.0	21.8	4.63	1.75	19200	983	16.4	1170	132	4.04	30.4	1100	203
8.3	61.1	54.5	22.3	4.56	2.05	16600	858	16.0	988	112	3.90	21.2	967	172
10.7	37.1	53.8	22.8	4.43	2.60	13500	708	15.5	770	87.0	3.69	13.7	807	135
5.0	-	47.8	28.9	4.13	1.59	21900	1100	16.4	1040	132	3.58	51.1	1250	204
5.5	-	52.5	24.0	4.10	1.76	19500	992	16.3	926	118	3.56	37.7	1120	182
6.5	-	60.0	18.4	4.09	2.03	16700	858	16.2	796	101	3.54	24.4	963	156
7.4	-	59.5	18.7	4.04	2.31	14900	769	16.0	695	88.2	3.45	18.1	868	137
9.5	46.9	58.8	19.1	3.92	2.92	12100	636	15.4	542	68.8	3.26	11.6	726	107
3.8	-	47.8	28.9	3.01	2.12	17400	874	15.9	444	74.6	2.54	40.8	1010	118
4.2	-	52.5	24.0	2.99	2.36	15500	785	15.8	390	66.1	2.51	29.9	905	105
4.8	-	60.0	18.4	2.98	2.71	13300	682	15.7	336	56.9	2.50	19.6	781	89.6
5.8	-	59.4	18.7	2.91	3.19	11600	599	15.3	283	47.9	2.40	14.0	692	76.0
7.1	-	60.6	18.0	2.84	3.90	9780	512	14.9	229	38.8	2.29	9.62	597	62.2



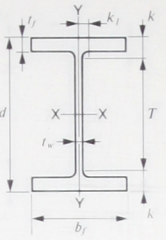
TAILOR-MADE WIDE FLANGE BEAMS

Dimensions

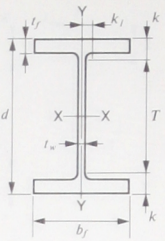
Designation		Area A	Depth d		Web			Flange				Distance		
					Thickness t_w		$\frac{t_w}{2}$	Width b_f		Thickness t_f		T	k	k_1
		In.^{2}	In.		In.		In.	In.		In.		In.	In.	In.
WTM 40X16	X655	192.0	43.62	43 5/8	1.970	2	1	16.870	16 7/8	3.540	3 9/16	33 3/4	4 15/16	21 1/4
	593	174.0	42.99	43	1.790	1 13/16	1	16.690	16 3/4	3.230	3 1/4	33 3/4	4 5/8	21 1/8
	531	156.0	42.34	42 3/8	1.610	1 5/8	13/16	16.510	16 1/2	2.910	2 15/16	33 3/4	4 5/16	2
	480	140.0	41.81	41 3/4	1.460	1 7/16	3/4	16.360	16 3/8	2.640	2 5/8	33 3/4	4	2
	436	128.0	41.34	41 3/8	1.340	1 5/16	11/16	16.240	16 1/4	2.400	2 3/8	33 3/4	3 13/16	1 15/
	397	116.0	40.95	41	1.220	1 1/4	5/8	16.120	16 1/8	2.200	2 3/16	33 3/4	3 5/8	1 7/8
	362	106.0	40.55	40 1/2	1.120	1 1/8	9/16	16.020	16	2.010	2	33 3/4	3 3/8	1 13/
	324	95.3	40.16	40 1/8	1.000	1	1/2	15.905	15 7/8	1.810	1 13/16	33 3/4	3 3/16	1 3/
	297	87.4	39.84	39 7/8	0.930	15/16	1/2	15.825	15 7/8	1.650	1 5/8	33 3/4	3 1/16	1 1/
WTM 40X12	X561	164.0	43.62	43 5/8	1.970	2	1	12.930	12 7/8	3.540	3 9/16	33 3/4	4 15/16	21/
	520	152.0	43.15	43 1/8	1.830	1 13/16	1	12.790	12 3/4	3.310	3 5/16	33 3/4	4 11/16	23/
	475	139.0	42.60	42 5/8	1.690	1 11/16	7/8	12.660	12 5/8	3.030	3	33 3/4	4 7/16	21/
	437	128.0	42.13	42 1/8	1.560	1 9/16	13/16	12.520	12 1/2	2.800	2 13/16	33 3/4	4 3/16	2
	396	116.0	41.65	41 5/8	1.420	1 7/16	3/4	12.380	12 3/8	2.560	2 9/16	33 3/4	4	1 15
	359	105.0	41.18	41 1/8	1.300	1 5/16	11/16	12.260	12 1/4	2.320	2 5/16	33 3/4	3 11/16	17/
	327	96.0	40.79	40 3/4	1.180	1 3/16	5/8	12.145	12 1/8	2.130	2 1/8	33 3/4	3 1/2	1 13
	294	86.3	40.39	40 3/8	1.060	1 1/16	9/16	12.025	12	1.930	1 15/16	33 3/4	3 5/16	13/
	264	77.6	40.00	40	0.960	1	1/2	11.930	11 7/8	1.730	1 3/4	33 3/4	3 1/8	13/
WTM 36X16.5	X848	249.0	42.45	42 1/2	2.520	2 1/2	1 1/4	18.130	18 1/8	4.530	4 1/2	31 1/8	5 11/16	21/
	798	234.0	41.97	42	2.380	2 3/8	1 13/16	17.990	18	4.290	4 5/16	31 1/8	5 7/16	23/
	720	211.0	41.19	41 1/4	2.165	2 3/16	1 1/8	17.775	17 3/4	3.900	3 7/8	31 1/8	5 1/16	21/
	650	190.0	40.47	40 1/2	1.970	2	1	17.575	17 5/8	3.540	3 9/16	31 1/8	4 11/16	2
	588	172.0	39.84	39 7/8	1.790	1 13/16	1	17.400	17 3/8	3.230	3 1/4	31 1/8	4 3/8	17/
	527	154.0	39.21	39 1/4	1.610	1 5/8	13/16	17.220	17 1/4	2.910	2 15/16	31 1/8	4 1/16	13/
	485	142.0	38.74	38 3/4	1.500	1 1/2	3/4	17.105	17 1/8	2.680	2 11/16	31 1/8	3 13/16	13/
	439	128.0	38.26	38 1/4	1.360	1 3/8	11/16	16.965	17	2.440	2 7/16	31 1/8	3 9/16	15/
	393	115.0	37.80	37 3/4	1.220	1 1/4	5/8	16.830	16 7/8	2.200	2 3/16	31 1/8	3 5/16	15/
	359	105.0	37.40	37 3/8	1.120	1 1/8	9/16	16.730	16 3/4	2.010	2	31 1/8	3 1/8	19/
	328	96.4	37.09	37 1/8	1.020	1	1/2	16.630	16 5/8	1.850	1 7/8	31 1/8	3	11/
WTM 36X12	X548	161.0	41.06	41	1.970	2	1	13.220	13 1/4	3.540	3 9/16	32 1/8	4 7/16	11
	508	149.0	40.58	40 5/8	1.830	1 13/16	1	13.080	13 1/8	3.310	3 5/16	32 1/8	4 1/4	13/
	464	136.0	40.03	40	1.690	1 11/16	7/8	12.940	13	3.030	3	32 1/8	4	11
	426	125.0	39.56	39 1/2	1.560	1 9/16	13/16	12.810	12 3/4	2.800	2 13/16	32 1/8	3 11/16	15/
	387	113.0	39.09	39 1/8	1.420	1 7/16	3/4	12.670	12 5/8	2.560	2 9/16	32 1/8	3 1/2	11
	350	102.0	38.61	38 5/8	1.300	1 5/16	11/16	12.550	12 1/2	2.320	2 5/16	32 1/8	3 1/4	17
	318	93.5	38.22	38 1/4	1.180	1 3/16	5/8	12.430	12 3/8	2.130	2 1/8	32 1/8	3 1/16	13
	286	84.0	37.83	37 7/8	1.060	1 1/16	9/16	12.315	12 3/8	1.930	1 15/16	32 1/8	2 7/8	13
	256	75.4	37.43	37 3/8	0.960	1	1/2	12.215	12 1/4	1.730	1 3/4	32 1/8	2 5/8	15
	232	68.1	37.12	37 1/8	0.870	7/8	7/16	12.120	12 1/8	1.570	1 9/16	32 1/8	2 1/2	11

TAILOR-MADE WIDE FLANGE BEAMS

Properties



Nom. Wt. per Ft. lb.	Compact Section Criteria $\frac{b_f}{2t_f}$	Compact Section Criteria F_y' Ksi	Compact Section Criteria $\frac{d}{t_w}$	Compact Section Criteria F_y'' Ksi	r_T In.	$\frac{d}{A_f}$	Elastic-Properties Axis X-X I In.⁴	Axis X-X S In.³	Axis X-X r In.	Axis Y-Y I In.⁴	Axis Y-Y S In.³	Axis Y-Y r In.	Torsional-constant J In.⁴	Plastic Modulus Z_x In.³	Plastic Modulus Z_y In.³
555	2.4	-	22.1	-	4.43	0.73	56500	2590	17.2	2860	339	3.86	596	3060	541
593	2.6	-	24.0	-	4.38	0.80	50400	2340	17.0	2520	302	3.81	451	2750	481
531	2.8	-	26.3	-	4.33	0.88	44300	2090	16.9	2200	266	3.75	329	2450	422
480	3.1	-	28.6	-	4.28	0.97	39500	1890	16.8	1940	237	3.72	245	2180	374
436	3.4	-	30.9	-	4.24	1.06	35400	1710	16.6	1720	212	3.67	186	1980	334
397	3.7	-	33.6	58.6	4.21	1.15	32000	1560	16.6	1540	191	3.65	142	1790	300
362	4.0	-	36.2	50.4	4.17	1.26	28900	1420	16.5	1380	173	3.61	109	1630	270
324	4.4	-	40.2	41.0	4.14	1.40	25600	1280	16.4	1220	153	3.57	79.4	1460	239
297	4.8	-	42.8	36.0	4.11	1.53	23200	1170	16.3	1090	138	3.54	61.2	1330	215
561	1.8	-	22.1	-	3.32	0.95	45300	2080	16.6	1300	201	2.82	480	2500	333
520	1.9	-	23.6	-	3.28	1.02	41500	1920	16.5	1170	184	2.78	389	2300	303
475	2.1	-	25.2	-	3.24	1.11	37300	1750	16.4	1040	164	2.74	301	2090	270
437	2.2	-	27.0	-	3.19	1.20	33900	1610	16.3	929	148	2.69	237	1910	243
396	2.4	-	29.3	-	3.15	1.31	30400	1460	16.2	819	132	2.66	180	1720	216
359	2.6	-	31.7	-	3.11	1.45	27200	1320	16.1	720	118	2.62	135	1550	191
327	2.9	-	34.6	55.3	3.08	1.58	24500	1200	16.0	642	106	2.59	104	1420	171
294	3.1	-	38.1	45.5	3.05	1.74	21900	1080	15.9	564	93.8	2.56	76.8	1270	151
264	3.4	-	41.7	38.0	3.01	1.94	19400	971	15.8	493	82.6	2.52	56.1	1130	132
848	2.0	-	16.8	-	4.84	0.52	67400	3170	16.4	4550	501	4.27	1270	3830	799
798	2.1	-	17.6	-	4.80	0.54	62600	2980	16.4	4200	467	4.24	1070	3570	743
720	2.3	-	19.0	-	4.73	0.59	55300	2690	16.2	3680	414	4.18	804	3190	656
650	2.5	-	20.5	-	4.67	0.65	48900	2420	16.0	3230	367	4.12	600	2840	580
588	2.7	-	22.3	-	4.62	0.71	43500	2180	15.9	2850	328	4.07	453	2550	517
527	3.0	-	24.4	-	4.57	0.78	38300	1950	15.8	2490	289	4.02	330	2270	454
485	3.2	-	25.8	-	4.53	0.85	34700	1790	15.6	2250	263	3.98	260	2070	412
439	3.5	-	28.1	-	4.49	0.92	31000	1620	15.6	1990	235	3.95	195	1860	367
393	3.8	-	31.0	-	4.45	1.02	27500	1450	15.5	1750	208	3.90	143	1660	325
359	4.2	-	33.4	59.2	4.42	1.11	24800	1320	15.4	1570	188	3.87	109	1510	292
328	4.5	-	36.4	50.0	4.39	1.21	22500	1210	15.3	1420	171	3.84	84.5	1380	265
548	1.9	-	20.8	-	3.43	0.88	39600	1930	15.7	1390	210	2.93	466	2330	343
508	2.0	-	22.2	-	3.39	0.94	36300	1790	15.6	1250	192	2.90	378	2140	312
464	2.1	-	23.7	-	3.35	1.02	32600	1630	15.5	1110	171	2.85	291	1940	278
426	2.3	-	25.4	-	3.31	1.10	29500	1490	15.4	992	155	2.82	229	1770	251
387	2.5	-	27.5	-	3.27	1.21	26500	1350	15.3	876	138	2.78	174	1590	223
350	2.7	-	29.7	-	3.23	1.33	23600	1220	15.2	771	123	2.75	130	1420	197
318	2.9	-	32.4	63.0	3.20	1.44	21300	1110	15.1	687	110	2.71	99.5	1300	177
286	3.2	-	35.7	51.9	3.17	1.59	18900	1000	15.0	604	98.2	2.68	73.5	1170	156
256	3.5	-	39.0	43.4	3.13	1.77	16800	895	14.9	528	86.5	2.65	53.3	1040	137
232	3.9	-	42.7	36.3	3.11	1.95	15000	809	14.8	468	77.2	2.62	39.8	936	122



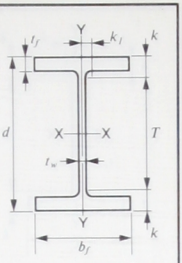
TAILOR-MADE WIDE FLANGE BEAMS

Dimensions

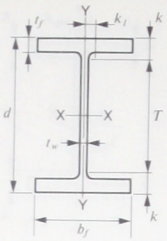
Designation	Area A	Depth d		Web			Flange				Distance		
				Thickness t_w		$\frac{t_w}{2}$	Width b_f		Thickness t_f		T	k	k
	In.²	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.
WTM 33X15.75 X619	181.0	38.47	38 1/2	1.970	2	1	16.910	16 7/8	3.540	3 9/16	29 3/4	4 3/8	13/4
567	166.0	37.91	37 7/8	1.810	1 13/16	1	16.750	16 3/4	3.270	3 1/4	29 3/4	4 1/16	111/
515	151.0	37.36	37 3/8	1.650	1 5/8	13/16	16.590	16 5/8	2.990	3	29 3/4	3 13/16	15/1
468	137.0	36.81	36 3/4	1.520	1 1/2	3/4	16.455	16 1/2	2.720	2 3/4	29 3/4	3 1/2	19/
424	124.0	36.34	36 3/8	1.380	1 3/8	11/16	16.315	16 3/8	2.480	2 1/2	29 3/4	3 5/16	17/
387	113.0	35.95	36	1.260	1 1/4	5/8	16.200	16 1/4	2.280	2 1/4	29 3/4	3 1/8	13/1
354	104.0	35.55	35 1/2	1.160	1 3/16	5/8	16.100	16 1/8	2.090	2 1/16	29 3/4	2 7/8	13/1
318	93.5	35.16	35 1/8	1.040	1 1/16	9/16	15.985	16	1.890	1 7/8	29 3/4	2 11/16	15/
291	85.6	34.84	34 7/8	0.960	1	1/2	15.905	15 7/8	1.730	1 3/4	29 3/4	2 9/16	11/
263	77.4	34.53	34 1/2	0.870	7/8	7/16	15.805	15 3/4	1.570	1 9/16	29 3/4	2 3/8	13/
WTM 33X11.5 X520	152.0	38.47	38 1/2	1.970	2	1	12.800	12 3/4	3.540	3 9/16	29 3/4	4 3/8	13/
476	139.0	37.92	37 7/8	1.810	1 13/16	1	12.645	12 5/8	3.270	3 1/4	29 3/4	4 1/16	111
432	126.0	37.37	37 3/8	1.650	1 5/8	13/16	12.485	12 1/2	2.990	3	29 3/4	3 13/16	19/
398	117.0	36.89	36 7/8	1.540	1 9/16	13/16	12.370	12 3/8	2.760	2 3/4	29 3/4	3 9/16	19/
361	105.0	36.42	36 3/8	1.400	1 3/8	11/16	12.230	12 1/4	2.520	2 1/2	29 3/4	3 5/16	17/
332	97.5	36.03	36	1.300	1 5/16	11/16	12.130	12 1/8	2.320	2 5/16	29 3/4	3 1/8	17/
302	88.6	35.63	35 5/8	1.180	1 3/16	5/8	12.015	12	2.130	2 1/8	29 3/4	3	13/
271	79.6	35.24	35 1/4	1.060	1 1/16	9/16	11.895	11 7/8	1.930	1 15/16	29 3/4	2 3/4	15/
243	71.4	34.85	34 7/8	0.960	1	1/2	11.800	11 3/4	1.730	1 3/4	29 3/4	2 9/16	11/
219	64.5	34.53	34 1/2	0.870	7/8	7/16	11.700	11 3/4	1.570	1 9/16	29 3/4	2 3/8	13/
204	59.8	34.30	34 1/4	0.810	13/16	7/16	11.640	11 5/8	1.460	1 7/16	29 3/4	2 1/4	13/
187	55.0	34.06	34	0.750	3/4	3/8	11.580	11 5/8	1.340	1 5/16	29 3/4	2 1/8	11/
169	49.5	33.82	33 7/8	0.670	11/16	3/8	11.500	11 1/2	1.220	1 1/4	29 3/4	2 1/16	11/
WTM 32X12 X511	150.0	35.98	36	1.970	2	1	12.990	13	3.540	3 9/16	26 1/4	4 7/8	21/
462	135.0	35.35	35 3/8	1.790	1 13/16	1	12.815	12 7/8	3.230	3 1/4	26 1/4	4 9/16	21/
418	122.0	34.80	34 3/4	1.630	1 5/8	13/16	12.655	12 5/8	2.950	3	26 1/4	4 1/4	2
380	111.0	34.25	34 1/4	1.500	1 1/2	3/4	12.520	12 1/2	2.680	2 11/16	26 1/4	4	2
343	100.0	33.78	33 3/4	1.360	1 3/8	11/16	12.380	12 3/8	2.440	2 7/16	26 1/4	3 3/4	11
313	92.0	33.39	33 3/8	1.240	1 1/4	5/8	12.260	12 1/4	2.240	2 1/4	26 1/4	3 9/16	17/
286	84.0	32.99	33	1.140	1 1/8	9/16	12.165	12 1/8	2.050	2 1/16	26 1/4	3 3/8	11
256	75.2	32.60	32 5/8	1.020	1	1/2	12.045	12	1.850	1 7/8	26 1/4	3 3/16	13/
234	68.8	32.28	32 1/4	0.940	1	1/2	11.965	12	1.690	1 11/16	26 1/4	3	11

TAILOR-MADE WIDE FLANGE BEAMS

Properties



Nom-inal Wt. per Ft.	Compact Section Criteria				r_T	$\frac{d}{A_f}$	Elastic-Properties						Tor-sional-con stant	Plastic Modulus	
							Axis X-X			Axis Y-Y					
	$\frac{b_f}{2t_f}$	F_y'	$\frac{d}{t_w}$	F_y''			I	S	r	I	S	r	J	Z_x	Z_y
Lb.		Ksi		Ksi	In.		In.^{4}	In.^{3}	In.	In.^{4}	In.^{3}	In.	In.^{4}	In.^{3}	In.^{3}
619	2.4	-	19.5	-	4.51	0.64	41800	2170	15.2	2870	340	3.98	567	2560	537
567	2.6	-	20.9	-	4.46	0.69	37700	1990	15.1	2580	308	3.94	444	2330	485
515	2.8	-	22.6	-	4.42	0.75	33700	1810	14.9	2290	276	3.89	338	2110	433
468	3.0	-	24.2	-	4.37	0.82	30100	1630	14.8	2030	247	3.85	256	1890	387
424	3.3	-	26.3	-	4.33	0.90	26900	1480	14.7	1800	221	3.81	193	1700	345
387	3.6	-	28.5	-	4.30	0.97	24300	1350	14.7	1620	200	3.79	149	1550	312
354	3.9	-	30.6	-	4.27	1.06	21900	1230	14.5	1460	181	3.74	115	1420	282
318	4.2	-	33.8	57.8	4.24	1.16	19500	1110	14.4	1290	161	3.71	84.4	1270	250
291	4.6	-	36.3	50.1	4.21	1.27	17700	1010	14.4	1160	146	3.69	65.0	1150	226
263	5.0	-	39.7	41.9	4.18	1.39	15800	917	14.3	1030	131	3.66	48.5	1040	202
520	1.8	-	19.5	-	3.34	0.85	32900	1710	14.7	1260	197	2.88	445	2060	321
476	1.9	-	21.0	-	3.29	0.92	29700	1560	14.6	1120	177	2.84	348	1870	288
432	2.1	-	22.6	-	3.25	1.00	26500	1420	14.5	982	157	2.79	264	1680	255
398	2.2	-	24.0	-	3.21	1.08	24000	1300	14.3	881	142	2.74	209	1550	230
361	2.4	-	26.0	-	3.17	1.18	21400	1180	14.3	776	127	2.72	158	1380	204
332	2.6	-	27.7	-	3.14	1.28	19500	1080	14.1	696	115	2.67	124	1280	184
302	2.8	-	30.2	-	3.11	1.39	17500	983	14.1	620	103	2.65	95.0	1150	165
271	3.1	-	33.2	59.8	3.07	1.54	15600	884	14.0	545	91.6	2.62	70.1	1030	146
243	3.4	-	36.3	50.1	3.04	1.71	13800	791	13.9	476	80.7	2.58	50.8	919	128
219	3.7	-	39.7	41.9	3.01	1.88	12300	714	13.8	421	72.0	2.56	37.9	826	114
204	4.0	-	42.3	36.8	2.99	2.02	11400	662	13.8	385	66.2	2.54	30.5	764	104
187	4.3	-	45.4	32.0	2.97	2.19	10300	607	13.7	348	60.1	2.52	23.8	699	94.5
169	4.7	-	50.5	25.9	2.95	2.41	9290	549	13.7	310	53.9	2.50	17.7	629	84.4
511	1.8	-	18.3	-	3.41	0.78	28500	1580	13.8	1310	202	2.96	462	1920	328
462	2.0	-	19.7	-	3.35	0.85	25300	1430	13.7	1150	179	2.92	349	1710	290
418	2.1	-	21.3	-	3.31	0.93	22500	1290	13.6	1010	159	2.87	265	1530	257
380	2.3	-	22.8	-	3.26	1.02	20000	1170	13.4	886	142	2.83	200	1380	228
343	2.5	-	24.8	-	3.22	1.12	17800	1060	13.4	779	126	2.79	151	1230	201
313	2.7	-	26.9	-	3.18	1.22	16100	963	13.2	694	113	2.75	116	1130	181
286	3.0	-	28.9	-	3.15	1.32	14500	878	13.1	620	102	2.72	89.5	1030	162
256	3.3	-	32.0	64.7	3.12	1.46	12800	788	13.1	542	90.0	2.68	65.6	915	143
234	3.5	-	34.3	56.0	3.09	1.60	11600	719	13.0	485	81.1	2.66	50.5	832	128



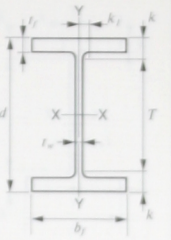
TAILOR-MADE WIDE FLANGE BEAMS

Dimensions

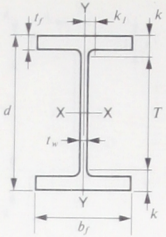
Designation		Area A	Depth d		Web			Flange				Distance		
					Thickness t_w		$\frac{t_w}{2}$	Width b_f		Thickness t_f		T	k	k_1
		In.²	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.
WTM 30X15	X581	170.0	35.39	35 3/8	1.970	2	1	16.200	16 1/4	3.540	3 9/16	26 3/4	4 5/16	11
	526	154.0	34.76	34 3/4	1.790	1 13/16	1	16.020	16	3.230	3 1/4	26 3/4	4	15/
	477	140.0	34.21	34 1/4	1.630	1 5/8	13/16	15.865	15 7/8	2.950	3	26 3/4	3 3/4	19/
	433	127.0	33.66	33 5/8	1.500	1 1/2	3/4	15.725	15 3/4	2.680	2 11/16	26 3/4	3 7/16	11/
	391	114.0	33.19	33 1/4	1.360	1 3/8	11/16	15.590	15 5/8	2.440	2 7/16	26 3/4	3 1/4	17/
	357	104.0	32.80	32 3/4	1.240	1 1/4	5/8	15.470	15 1/2	2.240	2 1/4	26 3/4	3	13/
	326	95.7	32.40	32 3/8	1.140	1 1/8	9/16	15.370	15 3/8	2.050	2 1/16	26 3/4	2 13/16	15/
	292	85.7	32.01	32	1.020	1	1/2	15.255	15 1/4	1.850	1 7/8	26 3/4	2 5/8	11/
	261	76.7	31.61	31 5/8	0.930	15/16	1/2	15.155	15 1/8	1.650	1 5/8	26 3/4	2 7/16	13/
	235	69.0	31.30	31 1/4	0.830	13/16	7/16	15.055	15	1.500	1 1/2	26 3/4	2 1/4	11/
WTM 30X10.5	X475	139.0	35.40	35 3/8	1.970	2	1	11.800	11 3/4	3.540	3 9/16	26 3/4	4 5/16	11
	435	127.0	34.85	34 7/8	1.810	1 13/16	1	11.640	11 5/8	3.270	3 1/4	26 3/4	4 1/16	15/
	394	115.0	34.30	34 1/4	1.650	1 5/8	13/16	11.485	11 1/2	2.990	3	26 3/4	3 3/4	19/
	358	105.0	33.74	33 3/4	1.520	1 1/2	3/4	11.345	11 3/8	2.720	2 3/4	26 3/4	3 1/2	11/
	323	95.0	33.27	33 1/4	1.380	1 3/8	11/16	11.205	11 1/4	2.480	2 1/2	26 3/4	3 1/4	13/
	295	86.6	32.88	32 7/8	1.260	1 1/4	5/8	11.090	11 1/8	2.280	2 1/4	26 3/4	3 1/16	15/
	269	79.1	32.48	32 1/2	1.160	1 3/16	5/8	10.990	11	2.090	2 1/16	26 3/4	2 7/8	15/
	246	72.4	32.17	32 1/8	1.060	1 1/16	9/16	10.890	10 7/8	1.930	1 15/16	26 3/4	2 11/16	11/
	226	66.4	31.85	31 7/8	0.980	1	1/2	10.810	10 3/4	1.770	1 3/4	26 3/4	2 9/16	13/
	207	60.7	31.54	31 1/2	0.910	15/16	1/2	10.735	10 3/4	1.610	1 5/8	26 3/4	2 3/8	13/
	185	54.3	31.22	31 1/4	0.810	13/16	7/16	10.635	10 5/8	1.460	1 7/16	26 3/4	2 1/4	11/
	165	48.5	30.91	30 7/8	0.730	3/4	3/8	10.555	10 1/2	1.300	1 5/16	26 3/4	2 1/16	11/
	148	43.5	30.67	30 5/8	0.650	5/8	5/16	10.480	10 1/2	1.180	1 3/16	26 3/4	2	1
WTM 28X12	X485	142.0	32.13	32 1/8	1.970	2	1	13.010	13	3.540	3 9/16	22 3/4	4 11/16	21/
	438	128.0	31.50	31 1/2	1.790	1 13/16	1	12.835	12 7/8	3.230	3 1/4	22 3/4	4 3/8	2
	397	116.0	30.95	31	1.630	1 5/8	13/16	12.675	12 5/8	2.950	3	22 3/4	4 1/8	11
	360	105.0	30.39	30 3/8	1.500	1 1/2	3/4	12.540	12 1/2	2.680	2 11/16	22 3/4	3 13/16	17/
	325	95.5	29.92	29 7/8	1.360	1 3/8	11/16	12.400	12 3/8	2.440	2 7/16	22 3/4	3 9/16	11
	296	87.0	29.53	29 1/2	1.240	1 1/4	5/8	12.280	12 1/4	2.240	2 1/4	22 3/4	3 3/8	13
	270	79.5	29.13	29 1/8	1.140	1 1/8	9/16	12.185	12 1/8	2.050	2 1/16	22 3/4	3 3/16	11
	247	72.7	28.82	28 7/8	1.040	1 1/16	9/16	12.085	12 1/8	1.890	1 7/8	22 3/4	3 1/16	15
	226	66.5	28.50	28 1/2	0.960	1	1/2	12.005	12	1.730	1 3/4	22 3/4	2 7/8	15

TAILOR-MADE WIDE FLANGE BEAMS

Properties



Nominal Wt. per Ft.	Compact Section Criteria $\frac{b_f}{2t_f}$	Compact Section Criteria F_y'	Compact Section Criteria $\frac{d}{t_w}$	Compact Section Criteria F_y'''	r_T	$\frac{d}{A_f}$	Elastic-Properties Axis X-X I	Axis X-X S	Axis X-X r	Axis Y-Y I	Axis Y-Y S	Axis Y-Y r	Torsional-constant J	Plastic Modulus Z_x	Plastic Modulus Z_y
Lb.		Ksi		Ksi	In.		In.⁴	In.³	In.	In.⁴	In.³	In.	In.⁴	In.³	In.³
581	2.3	-	18.0	-	4.34	0.62	33000	1870	13.9	2530	312	3.86	537	2210	492
526	2.5	-	19.4	-	4.29	0.67	29300	1680	13.8	2230	278	3.80	405	1990	438
477	2.7	-	21.0	-	4.24	0.73	26100	1530	13.7	1970	249	3.75	307	1790	390
433	2.9	-	22.4	-	4.20	0.80	23200	1380	13.5	1750	222	3.71	231	1610	348
391	3.2	-	24.4	-	4.16	0.87	20700	1250	13.5	1550	198	3.68	174	1430	310
357	3.5	-	26.5	-	4.12	0.95	18600	1140	13.4	1390	179	3.65	134	1300	279
326	3.7	-	28.4	-	4.09	1.03	16800	1030	13.2	1240	162	3.61	103	1190	252
292	4.1	-	31.4	-	4.06	1.13	14900	928	13.2	1100	144	3.58	74.9	1060	223
261	4.6	-	34.0	57.2	4.02	1.26	13100	827	13.1	959	127	3.54	53.8	941	196
235	5.0	-	37.7	46.4	4.00	1.39	11700	746	13.0	855	114	3.52	40.0	845	175
475	1.7	-	18.0	-	3.09	0.85	25100	1420	13.4	988	167	2.67	406	1720	274
435	1.8	-	19.3	-	3.04	0.92	22500	1290	13.3	874	150	2.62	317	1560	245
394	1.9	-	20.8	-	2.99	1.00	20100	1170	13.2	766	133	2.58	241	1400	217
358	2.1	-	22.2	-	2.95	1.09	17800	1060	13.0	671	118	2.53	182	1270	192
323	2.3	-	24.1	-	2.91	1.20	15900	955	12.9	588	105	2.49	137	1140	169
295	2.4	-	26.1	-	2.88	1.30	14300	871	12.9	523	94.4	2.46	106	1030	152
269	2.6	-	28.0	-	2.85	1.41	12900	793	12.8	466	84.8	2.43	81.7	935	136
246	2.8	-	30.3	-	2.82	1.53	11700	727	12.7	418	76.8	2.40	63.7	853	123
226	3.1	-	32.5	62.5	2.79	1.66	10600	665	12.6	375	69.4	2.38	49.4	777	110
207	3.3	-	34.7	55.0	2.76	1.82	9540	605	12.5	334	62.2	2.35	37.7	705	98.8
185	3.6	-	38.5	44.5	2.74	2.01	8480	543	12.5	294	55.3	2.33	27.7	629	87.4
165	4.1	-	42.3	36.8	2.71	2.25	7470	483	12.4	256	48.5	2.30	19.7	558	76.4
148	4.4	-	47.2	29.7	2.69	2.48	6680	436	12.4	227	43.3	2.28	14.6	500	68.0
485	1.8	-	16.3	-	3.45	0.70	21600	1350	12.3	1320	202	3.05	448	1630	325
438	2.0	-	17.6	-	3.40	0.76	19100	1210	12.2	1150	179	3.00	338	1450	287
397	2.1	-	19.0	-	3.35	0.83	17000	1100	12.1	1010	160	2.95	257	1310	255
360	2.3	-	20.3	-	3.31	0.90	15000	990	12.0	889	142	2.91	194	1170	226
325	2.5	-	22.0	-	3.27	0.99	13400	894	11.8	781	126	2.86	146	1060	200
296	2.7	-	23.8	-	3.23	1.07	12000	815	11.8	696	113	2.83	112	957	179
270	3.0	-	25.6	-	3.20	1.17	10800	742	11.7	622	102	2.80	86.4	867	161
247	3.2	-	27.7	-	3.17	1.26	9800	680	11.6	559	92.5	2.77	67.3	790	146
226	3.5	-	29.7	-	3.15	1.37	8850	621	11.5	501	83.5	2.74	52.0	718	131



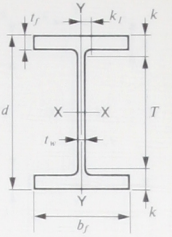
TAILOR-MADE WIDE FLANGE BEAMS

Dimensions

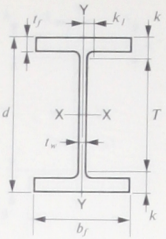
Designation		Area A	Depth d		Web			Flange				Distance		
					Thickness t_w		$\frac{t_w}{2}$	Width b_f		Thickness t_f		T	k	k_1
		In.²	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.
WTM 27X14	X539	158.0	32.52	32 1/2	1.970	2	1	15.255	15 1/4	3.540	3 9/16	24	4 1/4	15/
	494	145.0	31.97	32	1.810	1 13/16	1	15.095	15 1/8	3.270	3 1/4	24	4	19/
	448	131.0	31.42	31 3/8	1.650	1 5/8	13/16	14.940	15	2.990	3	24	3 11/16	11/
	407	119.0	30.87	30 7/8	1.520	1 1/2	3/4	14.800	14 3/4	2.720	2 3/4	24	3 7/16	17/
	368	108.0	30.39	30 3/8	1.380	1 3/8	11/16	14.665	14 5/8	2.480	2 1/2	24	3 3/16	15/
	336	98.7	30.00	30	1.260	1 1/4	5/8	14.545	14 1/2	2.280	2 1/4	24	3	15/
	307	90.2	29.61	29 5/8	1.160	1 3/16	5/8	14.445	14 1/2	2.090	2 1/16	24	2 13/16	11/
	281	82.6	29.29	29 1/4	1.060	1 1/16	9/16	14.350	14 3/8	1.930	1 15/16	24	2 5/8	13/
	258	75.7	28.98	29	0.980	1	1/2	14.270	14 1/4	1.770	1 3/4	24	2 1/2	11/
	235	69.1	28.66	28 5/8	0.910	15/16	1/2	14.190	14 1/4	1.610	1 5/8	24	2 5/16	11/
	217	63.8	28.43	28 3/8	0.830	13/16	7/16	14.115	14 1/8	1.500	1 1/2	24	2 3/16	11/
	194	57.0	28.11	28 1/8	0.750	3/4	3/8	14.035	14	1.340	1 5/16	24	2 1/16	1
WTM 27X10	X446	130.0	32.52	32 1/2	1.970	2	1	11.370	11 3/8	3.540	3 9/16	24	4 1/4	15/
	407	119.0	31.97	32	1.810	1 13/16	1	11.210	11 1/4	3.270	3 1/4	24	4	19/
	369	108.0	31.41	31 3/8	1.650	1 5/8	13/16	11.055	11	2.990	3	24	3 11/16	11/
	335	98.3	30.86	30 7/8	1.520	1 1/2	3/4	10.915	10 7/8	2.720	2 3/4	24	3 7/16	17/
	302	88.9	30.39	30 3/8	1.380	1 3/8	11/16	10.780	10 3/4	2.480	2 1/2	24	3 3/16	13/
	271	79.5	29.92	29 7/8	1.240	1 1/4	5/8	10.640	10 5/8	2.240	2 1/4	24	3	11/
	247	72.5	29.52	29 1/2	1.140	1 1/8	9/16	10.540	10 1/2	2.050	2 1/16	24	2 3/4	11/
	221	64.8	29.13	29 1/8	1.020	1	1/2	10.425	10 3/8	1.850	1 7/8	24	2 9/16	13/
	201	59.2	28.82	28 7/8	0.940	1	1/2	10.345	10 3/8	1.690	1 11/16	24	2 7/16	11/
	182	53.5	28.50	28 1/2	0.850	7/8	7/16	10.245	10 1/4	1.540	1 9/16	24	2 1/4	11/
	159	46.6	28.11	28 1/8	0.750	3/4	3/8	10.150	10 1/8	1.340	1 5/16	24	2 1/16	1
	143	41.9	27.87	27 7/8	0.670	11/16	3/8	10.070	10 1/8	1.220	1 1/4	24	1 15/16	1
	129	37.8	27.63	27 5/8	0.610	5/8	5/16	10.010	10	1.100	1 1/8	24	1 13/16	1
WTM 26X12	X473	138.0	30.24	30 1/4	1.970	2	1	13.050	13	3.540	3 9/16	20 7/8	4 11/16	21
	427	125.0	29.61	29 5/8	1.790	1 13/16	1	12.870	12 7/8	3.230	3 1/4	20 7/8	4 3/8	2
	387	113.0	29.06	29	1.630	1 5/8	13/16	12.715	12 3/4	2.950	3	20 7/8	4 1/16	11
	351	103.0	28.50	28 1/2	1.500	1 1/2	3/4	12.575	12 5/8	2.680	2 11/16	20 7/8	3 13/16	17
	317	93.2	28.03	28	1.360	1 3/8	11/16	12.440	12 1/2	2.440	2 7/16	20 7/8	3 9/16	11
	289	84.9	27.64	27 5/8	1.240	1 1/4	5/8	12.320	12 3/8	2.240	2 1/4	20 7/8	3 3/8	13
	264	77.5	27.24	27 1/4	1.140	1 1/8	9/16	12.220	12 1/4	2.050	2 1/16	20 7/8	3 3/16	11
	241	70.9	26.93	26 7/8	1.040	1 1/16	9/16	12.125	12 1/8	1.890	1 7/8	20 7/8	3	15
	221	64.9	26.61	26 5/8	0.960	1	1/2	12.045	12	1.730	1 3/4	20 7/8	2 7/8	15

TAILOR-MADE WIDE FLANGE BEAMS

Properties



Nominal Wt. per Ft.	Compact Section Criteria				r_T	$\frac{d}{A_f}$	Elastic-Properties						Torsional-constant	Plastic Modulus	
							Axis X-X			Axis Y-Y					
	$\frac{b_f}{2t_f}$	F_y'	$\frac{d}{t_w}$	F_y''			I	S	r	I	S	r	J	Z_x	Z_y
Lb.		Ksi		Ksi	In.		In.^{4}	In.^{3}	In.	In.^{4}	In.^{3}	In.	In.^{4}	In.^{3}	In.^{3}
539	2.2	-	16.5	-	4.10	0.60	25500	1570	12.7	2110	277	3.66	499	1880	437
494	2.3	-	17.7	-	4.05	0.65	22900	1440	12.6	1890	250	3.61	391	1710	394
448	2.5	-	19.0	-	4.01	0.70	20400	1300	12.5	1670	224	3.57	297	1530	351
407	2.7	-	20.3	-	3.96	0.77	18100	1170	12.3	1480	200	3.52	225	1380	313
368	3.0	-	22.0	-	3.93	0.84	16100	1060	12.2	1310	179	3.48	169	1240	279
336	3.2	-	23.8	-	3.89	0.90	14500	970	12.1	1170	161	3.45	131	1130	252
307	3.5	-	25.5	-	3.86	0.98	13100	884	12.0	1050	146	3.42	101	1020	227
281	3.7	-	27.6	-	3.84	1.06	11900	811	12.0	953	133	3.40	78.8	933	206
258	4.0	-	29.6	-	3.81	1.15	10800	742	11.9	859	120	3.37	61.0	850	187
235	4.4	-	31.5	-	3.78	1.25	9660	674	11.8	768	108	3.33	46.3	769	168
217	4.7	-	34.3	56.3	3.76	1.34	8870	624	11.8	704	99.8	3.32	37.0	708	154
194	5.2	-	37.5	47.0	3.74	1.49	7820	556	11.7	618	88.1	3.29	26.5	628	136
446	1.6	-	16.5	-	2.99	0.81	19700	1210	12.3	884	155	2.61	385	1470	254
407	1.7	-	17.7	-	2.95	0.87	17700	1110	12.2	781	139	2.56	300	1340	227
369	1.8	-	19.0	-	2.90	0.95	15700	1000	12.1	683	124	2.51	228	1200	200
335	2.0	-	20.3	-	2.86	1.04	13900	902	11.9	597	109	2.46	173	1080	177
302	2.2	-	22.0	-	2.82	1.14	12400	815	11.8	524	97.1	2.43	130	973	156
271	2.4	-	24.1	-	2.78	1.26	10900	729	11.7	454	85.3	2.39	95.0	864	137
247	2.6	-	25.9	-	2.75	1.37	9780	662	11.6	403	76.5	2.36	72.9	782	122
221	2.8	-	28.6	-	2.71	1.51	8630	593	11.5	352	67.5	2.33	53.1	695	107
201	3.1	-	30.7	-	2.69	1.65	7780	540	11.5	314	60.7	2.30	40.7	630	96.2
182	3.3	-	33.5	58.8	2.66	1.81	6950	488	11.4	277	54.2	2.28	30.6	567	85.6
159	3.8	-	37.5	47.0	2.63	2.07	5950	424	11.3	235	46.2	2.24	20.3	489	72.8
143	4.1	-	41.6	38.2	2.61	2.27	5330	383	11.3	208	41.4	2.23	15.1	440	64.9
129	4.5	-	45.3	32.2	2.59	2.51	4760	345	11.2	184	36.8	2.21	11.2	395	57.6
473	1.8	-	15.4	-	3.48	0.65	18700	1240	11.6	1330	203	3.10	444	1490	325
427	2.0	-	16.5	-	3.43	0.71	16500	1120	11.5	1160	180	3.05	335	1340	287
387	2.2	-	17.8	-	3.38	0.77	14700	1010	11.4	1020	160	3.00	255	1200	255
351	2.3	-	19.0	-	3.34	0.85	12900	909	11.2	896	142	2.95	192	1080	226
317	2.5	-	20.6	-	3.30	0.92	11500	821	11.1	789	127	2.91	145	970	200
289	2.7	-	22.3	-	3.26	1.00	10300	748	11.0	703	114	2.88	111	878	180
264	3.0	-	23.9	-	3.23	1.09	9270	680	10.9	627	103	2.85	85.6	795	161
241	3.2	-	25.9	-	3.20	1.18	8400	624	10.9	564	93.1	2.82	66.7	724	146
221	3.5	-	27.7	-	3.18	1.28	7580	569	10.8	506	84.0	2.79	51.6	658	132



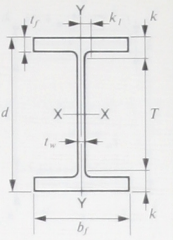
TAILOR-MADE WIDE FLANGE BEAMS

Dimensions

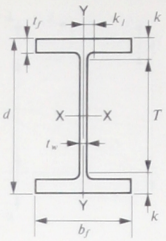
Designation	Area A	Depth d		Web			Flange				Distance			Nominal Wt. per Ft.	Compact Crit. $\frac{b_f}{2t_f}$	Compact Crit. F_y
				Thickness t_w		$\frac{t_w}{2}$	Width b_f		Thickness t_f		T	k	k_1			
	In.²	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	Lb.		Ksi
WTM 24X12.75 X492	144.0	29.65	29 5/8	1.970	2	1	14.115	14 1/8	3.540	3 9/16	21	4 5/16	19/1	492	2.0	-
450	132.0	29.09	29 1/8	1.810	1 13/16	1	13.955	14	3.270	3 1/4	21	4 1/16	11/2	450	2.1	-
408	119.0	28.54	28 1/2	1.650	1 5/8	13/16	13.800	13 3/4	2.990	3	21	3 3/4	13/8	408	2.3	-
370	108.0	27.99	28	1.520	1 1/2	3/4	13.660	13 5/8	2.720	2 3/4	21	3 1/2	15/1	370	2.5	-
335	98.4	27.52	27 1/2	1.380	1 3/8	11/16	13.520	13 1/2	2.480	2 1/2	21	3 1/4	11/4	335	2.7	-
306	89.8	27.13	27 1/8	1.260	1 1/4	5/8	13.405	13 3/8	2.280	2 1/4	21	3 1/16	13/1	306	2.9	-
279	82.0	26.73	26 3/4	1.160	1 3/16	5/8	13.305	13 1/4	2.090	2 1/16	21	2 7/8	11/8	279	3.2	-
250	73.5	26.34	26 3/8	1.040	1 1/16	9/16	13.185	13 1/8	1.890	1 7/8	21	2 11/16	11/8	250	3.5	-
229	67.2	26.02	26	0.960	1	1/2	13.110	13 1/8	1.730	1 3/4	21	2 1/2	1	229	3.8	-
207	60.7	25.71	25 3/4	0.870	7/8	7/16	13.010	13	1.570	1 9/16	21	2 3/8	1	207	4.1	-
192	56.3	25.47	25 1/2	0.810	13/16	7/16	12.950	13	1.460	1 7/16	21	2 1/4	1	192	4.4	-
176	51.7	25.24	25 1/4	0.750	3/4	3/8	12.890	12 7/8	1.340	1 5/16	21	2 1/8	15/	176	4.8	-
WTM 24X12 X457	134.0	28.31	28 1/4	1.950	2	1	13.050	13	3.520	3 1/2	18 3/4	4 3/4	21/8	457	1.9	-
414	121.0	27.68	27 5/8	1.790	1 13/16	1	12.890	12 7/8	3.210	3 3/16	18 3/4	4 7/16	2	414	2.0	-
375	110.0	27.13	27 1/8	1.630	1 5/8	13/16	12.735	12 3/4	2.930	2 15/16	18 3/4	4 3/16	115/	375	2.2	-
343	100.0	26.65	26 5/8	1.500	1 1/2	3/4	12.595	12 5/8	2.700	2 11/16	18 3/4	4	17/1	343	2.3	-
310	91.2	26.18	26 1/8	1.360	1 3/8	11/16	12.460	12 1/2	2.460	2 7/16	18 3/4	3 11/16	113/	310	2.5	-
280	82.1	25.71	25 3/4	1.240	1 1/4	5/8	12.340	12 3/8	2.220	2 1/4	18 3/4	3 1/2	13/	280	2.8	-
253	74.4	25.32	25 3/8	1.120	1 1/8	9/16	12.225	12 1/4	2.030	2	18 3/4	3 5/16	111	253	3.0	-
228	67.0	24.92	24 7/8	1.020	1	1/2	12.125	12 1/8	1.830	1 13/16	18 3/4	3 1/16	15/1	228	3.3	-
207	60.9	24.61	24 5/8	0.930	15/16	1/2	12.025	12	1.670	1 11/16	18 3/4	2 15/16	19/	207	3.6	-
188	55.3	24.29	24 1/4	0.850	7/8	7/16	11.945	12	1.520	1 1/2	18 3/4	2 3/4	19/	188	3.9	-
WTM 24X9 X354	103.0	28.86	28 7/8	1.750	1 3/4	7/8	10.200	10 1/4	3.150	3 1/8	21	3 15/16	13/	354	1.6	-
319	93.7	28.31	28 1/4	1.590	1 9/16	13/16	10.040	10	2.870	2 7/8	21	3 5/8	13/	319	1.7	-
291	85.5	27.84	27 7/8	1.460	1 7/16	3/4	9.905	9 7/8	2.640	2 5/8	21	3 7/16	15/	291	1.9	-
264	77.5	27.36	27 3/8	1.340	1 5/16	11/16	9.795	9 3/4	2.400	2 3/8	21	3 3/16	11/	264	2.0	-
239	70.3	26.97	27	1.220	1 1/4	5/8	9.670	9 5/8	2.200	2 3/16	21	3	13/	239	2.2	-
218	64.0	26.58	26 5/8	1.120	1 1/8	9/16	9.570	9 5/8	2.010	2	21	2 13/16	11/	218	2.4	-
198	58.3	26.26	26 1/4	1.020	1	1/2	9.470	9 1/2	1.850	1 7/8	21	2 5/8	11/	198	2.6	-
181	53.2	25.95	26	0.940	1	1/2	9.390	9 3/8	1.690	1 11/16	21	2 1/2	1	181	2.8	-
163	48.0	25.63	25 5/8	0.850	7/8	7/16	9.290	9 1/4	1.540	1 9/16	21	2 5/16	1	163	3.0	-
146	43.0	25.32	25 3/8	0.770	3/4	3/8	9.215	9 1/4	1.380	1 3/8	21	2 3/16	15	146	3.3	-
128	37.6	25.00	25	0.670	11/16	3/8	9.115	9 1/8	1.220	1 1/4	21	2	7/	128	3.7	-
115	33.9	24.76	24 3/4	0.610	5/8	5/16	9.055	9	1.100	1 1/8	21	1 7/8	7/	115	4.1	-
103	30.3	24.53	24 1/2	0.550	9/16	5/16	9.000	9	0.980	1	21	1 3/4	13	103	4.6	-

TAILOR-MADE WIDE FLANGE BEAMS

Properties



Nom-inal Wt. per Ft.	Compact Section Criteria				r_T	$\frac{d}{A_f}$	Elastic-Properties						Tor-sional-con stant	Plastic Modulus	
							Axis X-X			Axis Y-Y					
	$\frac{b_f}{2t_f}$	F_y'	$\frac{d}{t_w}$	F_y'''			I	S	r	I	S	r	J	Z_x	Z_y
Lb.		Ksi		Ksi	In.		In.^{4}	In.^{3}	In.	In.^{4}	In.^{3}	In.	In.^{4}	In.^{3}	In.^{3}
492	2.0	-	15.1	-	3.80	0.59	19100	1290	11.5	1670	237	3.41	456	1550	375
450	2.1	-	16.1	-	3.76	0.64	17100	1170	11.4	1490	214	3.36	357	1410	337
408	2.3	-	17.3	-	3.71	0.69	15100	1060	11.3	1320	191	3.33	271	1250	300
370	2.5	-	18.4	-	3.67	0.75	13400	957	11.1	1160	170	3.28	205	1120	267
335	2.7	-	19.9	-	3.63	0.82	11900	864	11.0	1030	152	3.23	154	1020	238
306	2.9	-	21.5	-	3.60	0.89	10700	789	10.9	919	137	3.20	119	922	214
279	3.2	-	23.0	-	3.57	0.96	9600	718	10.8	823	124	3.17	91.7	835	193
250	3.5	-	25.3	-	3.53	1.06	8490	644	10.7	724	110	3.14	67.3	744	171
229	3.8	-	27.1	-	3.51	1.15	7650	588	10.7	651	99.4	3.11	51.8	676	154
207	4.1	-	29.6	-	3.48	1.26	6820	531	10.6	578	88.8	3.08	38.6	606	137
192	4.4	-	31.4	-	3.46	1.35	6260	491	10.5	530	81.8	3.07	31.0	559	126
176	4.8	-	33.7	58.3	3.44	1.46	5680	450	10.5	479	74.3	3.04	24.1	511	115
457	1.9	-	14.5	-	3.50	0.62	15900	1120	10.9	1320	202	3.14	431	1360	321
414	2.0	-	15.5	-	3.45	0.67	14000	1010	10.8	1160	180	3.09	328	1210	285
375	2.2	-	16.6	-	3.41	0.73	12400	913	10.6	1020	160	3.04	248	1090	253
343	2.3	-	17.8	-	3.37	0.78	11100	833	10.5	906	144	3.01	194	982	227
310	2.5	-	19.3	-	3.33	0.85	9850	752	10.4	798	128	2.96	146	891	202
280	2.8	-	20.7	-	3.29	0.94	8680	675	10.3	699	113	2.92	108	794	178
253	3.0	-	22.6	-	3.25	1.02	7750	612	10.2	621	102	2.89	82.0	715	159
228	3.3	-	24.4	-	3.22	1.12	6850	550	10.1	546	90.1	2.85	60.6	638	141
207	3.6	-	26.5	-	3.19	1.23	6140	499	10.0	486	80.8	2.82	46.1	576	126
188	3.9	-	28.6	-	3.16	1.34	5500	453	9.97	433	72.6	2.80	35.0	519	113
354	1.6	-	16.5	-	2.69	0.90	12400	857	11.0	567	111	2.35	242	1040	181
319	1.7	-	17.8	-	2.64	0.98	10900	771	10.8	492	98.0	2.29	181	938	159
291	1.9	-	19.1	-	2.60	1.06	9760	701	10.7	434	87.5	2.25	140	847	142
264	2.0	-	20.4	-	2.57	1.16	8650	633	10.6	381	77.7	2.22	106	760	125
239	2.2	-	22.1	-	2.53	1.27	7740	574	10.5	335	69.3	2.18	80.8	685	111
218	2.4	-	23.7	-	2.50	1.38	6920	521	10.4	296	61.9	2.15	61.6	618	99.3
198	2.6	-	25.7	-	2.47	1.50	6230	475	10.3	264	55.7	2.13	47.5	560	89.0
181	2.8	-	27.6	-	2.45	1.64	5600	432	10.3	235	50.0	2.10	36.4	507	79.6
163	3.0	-	30.2	-	2.42	1.79	5000	390	10.2	207	44.6	2.08	27.3	455	70.6
146	3.3	-	32.9	61.1	2.39	1.99	4410	348	10.1	181	39.3	2.05	19.8	405	62.0
128	3.7	-	37.3	47.4	2.37	2.25	3810	305	10.1	155	33.9	2.03	13.5	352	53.3
115	4.1	-	40.6	40.1	2.35	2.49	3400	275	10.0	137	30.2	2.01	9.96	316	47.3
103	4.6	-	44.6	33.2	2.33	2.78	3000	245	9.96	119	26.5	1.99	7.11	280	41.5



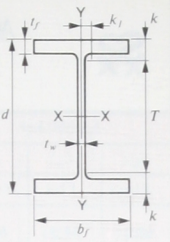
TAILOR-MADE WIDE FLANGE BEAMS

Dimensions

Designation		Area A	Depth d		Web			Flange				Distance			Nominal Wt. per Ft.	Compact Section Criteria		
					Thickness t_w		$\frac{t_w}{2}$	Width b_f		Thickness t_f		T	k	k_1		$\frac{b_f}{2t_f}$	F_y	$\frac{d}{t_w}$
		In.²	In.		In.		In.	In.		In.		In.	In.	In.	Lb.		Ksi	
WTM 22X12	X395	115.0	25.67	25 5/8	1.750	1 3/4	7/8	12.870	12 7/8	3.150	3 1/8	17	4 5/16	2	395	2.0	-	14.7
	357	104.0	25.12	25 1/8	1.590	1 9/16	13/16	12.715	12 3/4	2.870	2 7/8	17	4 1/16	1 15/	357	2.2	-	15.8
	326	95.6	24.65	24 5/8	1.460	1 7/16	3/4	12.575	12 5/8	2.640	2 5/8	17	3 13/16	1 7/8	326	2.4	-	16.9
	295	86.7	24.17	24 1/8	1.340	1 5/16	11/16	12.460	12 1/2	2.400	2 3/8	17	3 9/16	1 13/	295	2.6	-	18.0
	269	78.9	23.78	23 3/4	1.220	1 1/4	5/8	12.340	12 3/8	2.200	2 3/16	17	3 3/8	1 3/4	269	2.8	-	19.5
	245	71.9	23.39	23 3/8	1.120	1 1/8	9/16	12.245	12 1/4	2.010	2	17	3 3/16	1 11/	245	3.0	-	20.9
	223	65.7	23.07	23 1/8	1.020	1	1/2	12.145	12 1/8	1.850	1 7/8	17	3 1/16	1 5/8	223	3.3	-	22.6
	204	60.0	22.76	22 3/4	0.940	1	1/2	12.065	12 1/8	1.690	1 11/16	17	2 7/8	1 5/8	204	3.6	-	24.2
WTM 22X8.5	X236	69.4	24.98	25	1.300	1 5/16	11/16	9.030	9	2.340	2 5/16	18 1/8	3 7/16	1 11/	236	1.9	-	19.2
	216	63.5	24.59	24 5/8	1.200	1 3/16	5/8	8.930	8 7/8	2.150	2 1/8	18 1/8	3 1/4	1 5/8	216	2.1	-	20.5
	194	57.1	24.20	24 1/4	1.080	1 1/16	9/16	8.815	8 7/8	1.950	2	18 1/8	3 1/16	1 9/1	194	2.3	-	22.4
	178	52.3	23.88	23 7/8	1.000	1	1/2	8.735	8 3/4	1.790	1 13/16	18 1/8	2 7/8	1 1/2	178	2.4	-	23.9
	161	47.4	23.57	23 5/8	0.910	15/16	1/2	8.635	8 5/8	1.630	1 5/8	18 1/8	2 3/4	1 7/	161	2.6	-	25.9
	146	42.9	23.25	23 1/4	0.830	13/16	7/16	8.555	8 1/2	1.480	1 1/2	18 1/8	2 9/16	1 7/	146	2.9	-	28.0
	133	39.1	23.02	23	0.750	3/4	3/8	8.480	8 1/2	1.360	1 3/8	18 1/8	2 7/16	1 3/1	133	3.1	-	30.7
	118	34.5	22.70	22 3/4	0.670	11/16	3/8	8.400	8 3/8	1.200	1 3/16	18 1/8	2 5/16	1 5/	118	3.5	-	33.9
WTM 21X12.25	X402	118.0	26.02	26	1.730	1 3/4	7/8	13.405	13 3/8	3.130	3 1/8	18 1/4	3 7/8	1 7/	402	2.1	-	15.0
	364	107.0	25.47	25 1/2	1.590	1 9/16	13/16	13.265	13 1/4	2.850	2 7/8	18 1/4	3 5/8	1 3/1	364	2.3	-	16.0
	333	97.9	25.00	25	1.460	1 7/16	3/4	13.130	13 1/8	2.620	2 5/8	18 1/4	3 3/8	1 5/	333	2.5	-	17.1
	300	88.2	24.53	24 1/2	1.320	1 5/16	11/16	12.990	13	2.380	2 3/8	18 1/4	3 1/8	1 1/	300	2.7	-	18.6
	275	80.8	24.13	24 1/8	1.220	1 1/4	5/8	12.890	12 7/8	2.190	2 3/16	18 1/4	3	1 3/	275	2.9	-	19.8
	248	72.8	23.74	23 3/4	1.100	1 1/8	9/16	12.775	12 3/4	1.990	2	18 1/4	2 3/4	1 1/	248	3.2	-	21.6
	223	65.4	23.35	23 3/8	1.000	1	1/2	12.675	12 5/8	1.790	1 13/16	18 1/4	2 9/16	1 1/	223	3.5	-	23.4
	201	59.2	23.03	23	0.910	15/16	1/2	12.575	12 5/8	1.630	1 5/8	18 1/4	2 3/8	1	201	3.9	-	25.3
	182	53.6	22.72	22 3/4	0.830	13/16	7/16	12.500	12 1/2	1.480	1 1/2	18 1/4	2 1/4	1	182	4.2	-	27.4
	166	48.8	22.48	22 1/2	0.750	3/4	3/8	12.420	12 3/8	1.360	1 3/8	18 1/4	2 1/8	15	166	4.6	-	30.0
WTM 18X11	X311	91.5	22.32	22 3/8	1.520	1 1/2	3/4	12.005	12	2.740	2 3/4	15 1/2	3 7/16	1 3/	311	2.2	-	14.7
	283	83.2	21.85	21 7/8	1.400	1 3/8	11/16	11.890	11 7/8	2.500	2 1/2	15 1/2	3 3/16	1 3/	283	2.4	-	15.6
	258	75.9	21.46	21 1/2	1.280	1 1/4	5/8	11.770	11 3/4	2.300	2 5/16	15 1/2	3	1 1/	258	2.6	-	16.8
	234	68.8	21.06	21	1.160	1 3/16	5/8	11.650	11 5/8	2.110	2 1/8	15 1/2	2 3/4	1	234	2.8	-	18.2
	211	62.1	20.67	20 5/8	1.060	1 1/16	9/16	11.555	11 1/2	1.910	1 15/16	15 1/2	2 9/16	1	211	3.0	-	19.5
	192	56.4	20.35	20 3/8	0.960	1	1/2	11.455	11 1/2	1.750	1 3/4	15 1/2	2 7/16	15	192	3.3	-	21.2
	175	51.3	20.04	20	0.890	7/8	7/16	11.375	11 3/8	1.590	1 9/16	15 1/2	2 1/4	7/	175	3.6	-	22.5
	158	46.3	19.72	19 3/4	0.810	13/16	7/16	11.300	11 1/4	1.440	1 7/16	15 1/2	2 1/8	7/	158	3.9	-	24.3
	143	42.1	19.49	19 1/2	0.730	3/4	3/8	11.220	11 1/4	1.320	1 5/16	15 1/2	2	13	143	4.2	-	26.7
	130	38.2	19.25	19 1/4	0.670	11/16	3/8	11.160	11 1/8	1.200	1 3/16	15 1/2	1 7/8	13	130	4.6	-	28.7

TAILOR-MADE WIDE FLANGE BEAMS

Properties



Nominal Wt. per Ft.	Compact Section Criteria				r_T	$\frac{d}{A_f}$	Elastic-Properties						Torsional-constant	Plastic Modulus	
							Axis X-X			Axis Y-Y					
	$\frac{b_f}{2t_f}$	F_y'	$\frac{d}{t_w}$	F_y'''			I	S	r	I	S	r	J	Z_x	Z_y
Lb.		Ksi		Ksi	In.		In.^{4}	In.^{3}	In.	In.^{4}	In.^{3}	In.	In.^{4}	In.^{3}	In.^{3}
395	2.0	-	14.7	-	3.47	0.63	11500	895	10.00	1130	175	3.13	306	1070	277
357	2.2	-	15.8	-	3.42	0.69	10100	807	9.87	991	156	3.09	230	961	245
326	2.4	-	16.9	-	3.38	0.74	9050	734	9.73	881	140	3.03	179	877	220
295	2.6	-	18.0	-	3.34	0.81	8010	663	9.61	778	125	3.00	135	786	196
269	2.8	-	19.5	-	3.31	0.88	7170	603	9.53	693	112	2.96	104	710	176
245	3.0	-	20.9	-	3.28	0.95	6410	548	9.44	618	101	2.93	79.3	640	158
223	3.3	-	22.6	-	3.25	1.03	5780	501	9.38	555	91.3	2.91	61.5	582	142
204	3.6	-	24.2	-	3.22	1.12	5190	456	9.31	497	82.3	2.88	47.3	527	128
236	1.9	-	19.2	-	2.36	1.18	6420	514	9.61	291	64.6	2.05	94.8	620	105
216	2.1	-	20.5	-	2.33	1.28	5760	468	9.52	259	57.9	2.02	73.8	562	93.7
194	2.3	-	22.4	-	2.30	1.41	5090	421	9.45	225	51.1	1.99	54.7	501	82.3
178	2.4	-	23.9	-	2.27	1.53	4600	385	9.37	201	46.0	1.96	42.7	456	73.9
161	2.6	-	25.9	-	2.24	1.67	4100	348	9.31	177	40.9	1.93	32.3	410	65.5
146	2.9	-	28.0	-	2.21	1.84	3660	315	9.23	156	36.4	1.90	24.3	369	58.1
133	3.1	-	30.7	-	2.19	2.00	3310	287	9.20	139	32.8	1.89	18.7	335	52.2
118	3.5	-	33.9	57.5	2.16	2.25	2870	253	9.13	119	28.4	1.86	13.1	293	45.0
402	2.1	-	15.0	-	3.63	0.62	12200	937	10.2	1270	189	3.27	297	1130	296
364	2.3	-	16.0	-	3.59	0.67	10800	846	10.0	1120	168	3.23	225	1010	263
333	2.5	-	17.1	-	3.55	0.73	9610	769	9.91	994	151	3.19	174	915	237
300	2.7	-	18.6	-	3.51	0.79	8480	692	9.81	873	134	3.15	130	816	210
275	2.9	-	19.8	-	3.48	0.85	7620	632	9.71	785	122	3.12	101	741	189
248	3.2	-	21.6	-	3.45	0.93	6760	569	9.63	694	109	3.09	75.2	663	169
223	3.5	-	23.4	-	3.41	1.03	5950	510	9.54	609	96.1	3.05	54.9	589	149
201	3.9	-	25.3	-	3.38	1.12	5310	461	9.47	542	86.1	3.02	41.3	530	133
182	4.2	-	27.4	-	3.36	1.23	4730	417	9.40	483	77.2	3.00	31.0	476	119
166	4.6	-	30.0	-	3.34	1.33	4280	380	9.36	435	70.1	2.98	23.8	432	108
311	2.2	-	14.7	-	3.26	0.68	6960	624	8.72	795	132	2.95	177	753	207
283	2.4	-	15.6	-	3.23	0.74	6160	564	8.61	704	118	2.91	135	676	185
258	2.6	-	16.8	-	3.19	0.79	5510	514	8.53	628	107	2.88	104	611	166
234	2.8	-	18.2	-	3.16	0.86	4900	466	8.44	558	95.8	2.85	79.7	549	149
211	3.0	-	19.5	-	3.13	0.94	4330	419	8.35	493	85.3	2.82	59.3	490	132
192	3.3	-	21.2	-	3.10	1.02	3870	380	8.28	440	76.8	2.79	45.2	442	119
175	3.6	-	22.5	-	3.07	1.11	3450	344	8.20	391	68.8	2.76	34.2	398	106
158	3.9	-	24.3	-	3.05	1.21	3060	310	8.12	347	61.4	2.74	25.4	356	94.8
143	4.2	-	26.7	-	3.03	1.32	2750	282	8.09	311	55.5	2.72	19.4	322	85.4
130	4.6	-	28.7	-	3.01	1.44	2460	256	8.03	278	49.9	2.70	14.6	290	76.7

S_x ALLOWABLE STRESS DESIGN SELECTION TABLE

For shapes used as beams

F_y = 50 ksi			S_x	Shape	Depth d	F_y'	F_y = 36 ksi		
L_c	L_u	M_R					L_c	L_u	M_R
Ft.	Ft.	Kip-ft.	In.^{3}		In.	Ksi	Ft.	Ft.	Kip-ft.
16.2	**64.5**	**8730**	**3170**	**WTM 36 × 16.5 × 848**	**42 1/2**	**—**	**19.1**	**89.6**	**6350**
16.1	**61.3**	**8210**	**2980**	**WTM 36 × 16.5 × 798**	**42**	**—**	**19.0**	**85.1**	**5970**
15.9	**56.1**	**7380**	**2690**	**WTM 36 × 16.5 × 720**	**41 1/4**	**—**	**18.8**	**77.9**	**5370**
15.1	**45.6**	**7120**	**2590**	**WTM 40 × 16 × 655**	**43 5/8**	**—**	**17.8**	**63.4**	**5180**
15.7	**51.2**	**6640**	**2420**	**WTM 36 × 16.5 × 650**	**40 1/2**	**—**	**18.6**	**71.2**	**4830**
14.9	**41.8**	**6440**	**2340**	**WTM 40 × 16 × 593**	**43**	**—**	**17.6**	**58.1**	**4690**
15.6	**47.0**	**6010**	**2180**	**WTM 36 × 16.5 × 588**	**39 7/8**	**—**	**18.4**	**65.3**	**4370**
15.1	51.9	5980	2170	WTM 33 × 15.75 × 619	38 1/2	—	17.8	72.0	4350
14.8	**37.8**	**5760**	**2090**	**WTM 40 × 16 × 531**	**42 3/8**	**—**	**17.4**	**52.5**	**4190**
11.6	35.0	5710	2080	WTM 40 × 12 × 561	43 5/8	—	13.6	48.6	4150
15.0	48.2	5470	1990	WTM 33 × 15.75 × 567	37 7/8	—	17.7	66.9	3980
15.4	**42.6**	**5370**	**1950**	**WTM 36 × 16.5 × 527**	**39 1/4**	**—**	**18.2**	**59.2**	**3910**
11.8	38.0	5310	1930	WTM 36 × 12 × 548	41	—	14.0	52.8	3860
11.5	**32.7**	**5290**	**1920**	**WTM 40 × 12 × 520**	**43 1/8**	**—**	**13.5**	**45.4**	**3850**
14.7	**34.4**	**5200**	**1890**	**WTM 40 × 16 × 480**	**41 3/4**	**—**	**17.3**	**47.8**	**3780**
14.5	54.0	5130	1870	WTM 30 × 15 × 581	35 3/8	—	17.1	75.0	3730
14.9	44.3	4960	1810	WTM 33 × 15.75 × 515	37 3/8	—	17.5	61.5	3610
15.3	39.4	4930	1790	WTM 36 × 16.5 × 485	38 3/4	—	18.1	54.8	3580
11.7	35.6	4910	1790	WTM 36 × 12 × 508	40 5/8	—	13.8	49.4	3570
11.3	**30.0**	**4820**	**1750**	**WTM 40 × 12 × 475**	**42 5/8**	**—**	**13.4**	**41.7**	**3510**
14.5	**31.4**	**4710**	**1710**	**WTM 40 × 16 × 436**	**41 3/8**	**—**	**17.1**	**43.6**	**3430**
11.5	39.3	4710	1710	WTM 33 × 11.5 × 520	38 1/2	—	13.5	54.5	3420
14.3	49.6	4630	1680	WTM 30 × 15 × 526	34 3/4	—	16.9	68.9	3370
14.7	40.5	4490	1630	WTM 33 × 15.75 × 468	36 3/4	—	17.4	56.3	3270
11.6	32.6	4470	1630	WTM 36 × 12 × 464	40	—	13.7	45.3	3250
15.2	**36.1**	**4460**	**1620**	**WTM 36 × 16.5 × 439**	**38 1/4**	**—**	**17.9**	**50.1**	**3240**
11.2	**27.7**	**4420**	**1610**	**WTM 40 × 12 × 437**	**42 1/8**	**—**	**13.2**	**38.5**	**3220**
11.6	42.6	4360	1580	WTM 32 × 12 × 511	36	—	13.7	59.2	3170
13.7	55.4	4320	1570	WTM 27 × 14 × 539	32 1/2	—	16.1	76.9	3140
11.3	36.3	4300	1560	WTM 33 × 11.5 × 476	37 7/8	—	13.3	50.5	3130
14.4	**28.9**	**4300**	**1560**	**WTM 40 × 16 × 397**	**41**	**—**	**17.0**	**40.1**	**3130**
14.2	45.6	4190	1530	WTM 30 × 15 × 477	34 1/4	—	16.7	63.3	3050
11.5	30.2	4100	1490	WTM 36 × 12 × 426	39 1/2	—	13.5	42.0	2980
14.6	37.1	4070	1480	WTM 33 × 15.75 × 424	36 3/8	—	17.2	51.5	2960
11.1	**25.4**	**4010**	**1460**	**WTM 40 × 12 × 396**	**41 5/8**	**—**	**13.1**	**35.2**	**2920**

ALLOWABLE STRESS DESIGN SELECTION TABLE

For shapes used as beams

S_x

F_y = 50 ksi			S_x	Shape	Depth d	F_y'	F_y = 36 ksi		
L_c	L_u	M_R					L_c	L_u	M_R
Ft.	Ft.	Kip-ft.	In.^{3}		In.	Ksi	Ft.	Ft.	Kip-ft.
15.1	**32.7**	**4000**	**1450**	**WTM 36 × 16.5 × 393**	**37 3/4**	—	**17.8**	**45.3**	**2910**
13.5	51.5	3950	1440	WTM 27 × 14 × 494	32	—	15.9	71.5	2870
11.5	39.0	3930	1430	WTM 32 × 12 × 462	35 3/8	—	13.5	54.2	2860
14.3	**26.5**	**3920**	**1420**	**WTM 40 × 16 × 362**	**40 1/2**	—	**16.9**	**36.8**	**2850**
10.6	39.3	3900	1420	WTM 30 × 10.5 × 475	35 3/8	—	12.5	54.6	2830
11.2	33.3	3900	1420	WTM 33 × 11.5 × 432	37 3/8	—	13.2	46.2	2830
14.1	41.7	3790	1380	WTM 30 × 15 × 433	33 5/8	—	16.6	58.0	2750
11.3	27.7	3720	1350	WTM 36 × 12 × 387	39 1/8	—	13.4	38.4	2710
14.5	34.2	3720	1350	WTM 33 × 15.75 × 387	36	—	17.1	47.6	2710
11.7	47.8	3710	1350	WTM 28 × 12 × 485	32 1/8	—	13.7	66.4	2690
16.0	**25.8**	**3680**	**1340**	**W 40 × 18 × 328**	**40**	—	**18.9**	**35.9**	**2680**
15.0	30.0	3640	1320	WTM 36 × 16.5 × 359	37 3/8	—	17.7	41.6	2650
11.0	23.0	3630	1320	WTM 40 × 12 × 359	41 1/8	—	12.9	32.0	2640
11.1	30.8	3580	1300	WTM 33 × 11.5 × 398	36 7/8	—	13.1	42.8	2600
13.4	47.4	3580	1300	WTM 27 × 14 × 448	31 3/8	—	15.8	65.8	2600
11.3	35.8	3560	1290	WTM 32 × 12 × 418	34 3/4	—	13.4	49.7	2590
10.4	36.4	3560	1290	WTM 30 × 10.5 × 435	34 7/8	—	12.3	50.6	2590
12.6	56.2	3530	1290	WTM 24 × 12.75 × 492	29 5/8	—	14.9	78.0	2570
14.2	**23.9**	**3510**	**1280**	**WTM 40 × 16 × 324**	**40 1/8**	—	**16.8**	**33.2**	**2550**
14.0	38.2	3430	1250	WTM 30 × 15 × 391	33 1/4	—	16.5	53.1	2490
11.7	50.9	3410	1240	WTM 26 × 12 × 473	30 1/4	—	13.8	70.7	2480
14.4	31.6	3400	1230	WTM 33 × 15.75 × 354	35 1/2	—	17.0	43.8	2470
11.2	25.1	3360	1220	WTM 36 × 12 × 350	38 5/8	—	13.2	34.9	2440
16.0	**23.6**	**3350**	**1220**	**W 40 × 18 × 298**	**39 3/4**	—	**18.8**	**32.8**	**2430**
11.5	43.9	3340	1210	WTM 28 × 12 × 438	31 1/2	—	13.5	60.9	2430
10.2	41.3	3340	1210	WTM 27 × 10 × 446	32 1/2	—	12.0	57.3	2430
14.9	27.6	3340	1210	WTM 36 × 16.5 × 328	37 1/8	—	17.6	38.4	2430
10.9	21.1	3310	1200	WTM 40 × 12 × 327	40 3/4	—	12.8	29.4	2410
11.0	28.2	3240	1180	WTM 33 × 11.5 × 361	36 3/8	—	12.9	39.2	2360
13.3	43.5	3230	1170	WTM 27 × 14 × 407	30 7/8	—	15.6	60.4	2350
10.3	33.4	3220	1170	WTM 30 × 10.5 × 394	34 1/4	—	12.1	46.4	2340
11.2	32.7	3210	1170	WTM 32 × 12 × 380	34 1/4	—	13.2	45.4	2340
14.2	**21.8**	**3210**	**1170**	**WTM 40 × 16 × 297**	**39 7/8**	—	**16.7**	**30.3**	**2330**
13.9	35.2	3120	1140	WTM 30 × 15 × 357	32 3/4	—	16.3	48.9	2270
11.5	46.8	3070	1120	WTM 26 × 12 × 427	29 5/8	—	13.6	65.0	2230
11.1	23.1	3060	1110	WTM 36 × 12 × 318	38 1/4	—	13.1	32.1	2220
14.3	28.6	3050	1110	WTM 33 × 15.75 × 318	35 1/8	—	16.9	39.8	2220
14.9	25.4	3050	1110	W 36 × 16.5 × 300	36 3/4	—	17.6	35.3	2220
10.0	38.2	3040	1110	WTM 27 × 10 × 407	32	—	11.8	53.1	2210
14.2	**20.9**	**3030**	**1100**	**W 40 × 16 × 277**	**39 3/4**	—	**16.7**	**29.1**	**2200**
11.4	40.3	3020	1100	WTM 28 × 12 × 397	31	—	13.4	55.9	2200

S_x

ALLOWABLE STRESS DESIGN SELECTION TABLE

For shapes used as beams

F_y = 50 ksi			S_x	Shape	Depth d	F_y'	F_y = 36 ksi		
L_c	L_u	M_R					L_c	L_u	M_R
Ft.	Ft.	Kip-ft.	In.^{3}		In.	Ksi	Ft.	Ft.	Kip-ft
15.9	**21.3**	**3010**	**1090**	**W 40 × 18 × 268**	**39 3/8**	**—**	**18.7**	**29.5**	**2190**
10.8	19.2	2980	1080	WTM 40 × 12 × 294	40 3/8	—	12.7	26.6	2170
10.9	26.0	2970	1080	WTM 33 × 11.5 × 332	36	—	12.8	36.2	2160
13.1	39.9	2920	1060	WTM 27 × 14 × 368	30 3/8	—	15.5	55.4	2120
10.2	30.5	2910	1060	WTM 30 × 10.5 × 358	33 3/4	—	12.0	42.3	2110
11.1	29.8	2900	1060	WTM 32 × 12 × 343	33 3/4	—	13.1	41.4	2110
13.8	32.4	2850	1030	WTM 30 × 15 × 326	32 3/8	—	16.2	45.0	2070
14.9	23.8	2840	1030	W 36 × 16.5 × 280	36 1/2	—	17.5	33.0	2070
14.2	26.3	2790	1010	WTM 33 × 15.75 × 291	34 7/8	—	16.8	36.6	2030
11.4	43.0	2770	1010	WTM 26 × 12 × 387	29	—	13.4	59.8	2020
11.0	20.9	2750	1000	WTM 36 × 12 × 286	37 7/8	—	13.0	29.1	2000
9.9	35.1	2750	1000	WTM 27 × 10 × 369	31 3/8	—	11.7	48.7	2000
14.1	**18.9**	**2730**	**992**	**W 40 × 16 × 249**	**39 3/8**	**—**	**16.6**	**26.3**	**1980**
11.2	36.9	2720	990	WTM 28 × 12 × 360	30 3/8	—	13.2	51.2	1980
10.8	23.9	2700	983	WTM 33 × 11.5 × 302	35 5/8	—	12.7	33.3	1970
15.9	**19.0**	**2700**	**983**	**W 40 × 18 × 244**	**39**	**—**	**18.7**	**26.4**	**1970**
10.7	17.2	2670	971	WTM 40 × 12 × 264	40	—	12.6	23.9	1940
13.0	36.8	2670	970	WTM 27 × 14 × 336	30	—	15.4	51.2	1940
11.0	27.4	2650	963	WTM 32 × 12 × 313	33 3/8	—	12.9	38.1	1930
10.0	27.8	2630	955	WTM 30 × 10.5 × 323	33 1/4	—	11.8	38.7	1910
14.8	21.9	2620	953	W 36 × 16.5 × 260	36 1/4	—	17.5	30.4	1910
13.7	29.4	2550	928	WTM 30 × 15 × 292	32	—	16.1	40.8	1860
14.2	24.0	2520	917	WTM 33 × 15.75 × 263	34 1/2	—	16.7	33.3	1830
11.3	39.4	2500	909	WTM 26 × 12 × 351	28 1/2	—	13.3	54.7	1820
9.8	32.1	2480	902	WTM 27 × 10 × 335	30 7/8	—	11.5	44.5	1800
10.9	18.8	2460	895	WTM 36 × 12 × 256	37 3/8	—	12.9	26.1	1790
14.8	20.6	2460	895	W 36 × 16.5 × 245	36 1/8	—	17.4	28.6	1790
11.1	33.7	2460	894	WTM 28 × 12 × 325	29 7/8	—	13.1	46.8	1790
10.7	21.7	2430	884	WTM 33 × 11.5 × 271	35 1/4	—	12.6	30.2	1770
12.9	34.0	2430	884	WTM 27 × 14 × 307	29 5/8	—	15.2	47.2	1770
10.9	25.2	2410	878	WTM 32 × 12 × 286	33	—	12.8	35.0	1760
10.6	**15.7**	**2400**	**874**	**W 40 × 12 × 235**	**39 3/4**	**—**	**12.6**	**21.8**	**1750**
9.9	25.6	2390	871	WTM 30 × 10.5 × 295	32 7/8	—	11.7	35.6	1740
12.1	40.6	2380	864	WTM 24 × 12.75 × 335	27 1/2	—	14.3	56.4	1730
15.9	**16.3**	**2360**	**858**	**W 40 × 18 × 221**	**38 5/8**	**61.1**	**18.7**	**22.6**	**1720**
14.1	**16.4**	**2360**	**858**	**W 40 × 16 × 215**	**39**	**—**	**16.6**	**22.8**	**1720**
14.8	19.3	2300	837	W 36 × 16.5 × 230	35 7/8	—	17.4	26.8	1670
14.2	21.7	2280	829	W 33 × 15.75 × 241	34 1/8	—	16.7	30.1	1660
13.6	26.4	2270	827	WTM 30 × 15 × 261	31 5/8	—	16.0	36.6	1650
11.1	36.1	2260	821	WTM 26 × 12 × 317	28	—	13.1	50.1	1640
11.0	31.0	2240	815	WTM 28 × 12 × 296	29 1/2	—	13.0	43.1	1630
9.7	29.3	2240	815	WTM 27 × 10 × 302	30 3/8	—	11.4	40.7	1630
12.9	31.5	2230	811	WTM 27 × 14 × 281	29 1/4	—	15.1	43.8	1620
10.9	17.1	2220	809	WTM 36 × 12 × 232	37 1/8	—	12.8	23.7	1620
9.8	23.6	2180	793	WTM 30 × 10.5 × 269	32 1/2	—	11.6	32.7	1590
10.6	19.5	2180	791	WTM 33 × 11.5 × 243	34 7/8	—	12.5	27.1	1580
12.0	37.6	2170	789	WTM 24 × 12.75 × 306	27 1/8	—	14.1	52.2	1580
10.8	22.8	2170	788	WTM 32 × 12 × 256	32 5/8	—	12.7	31.6	1560

ALLOWABLE STRESS DESIGN SELECTION TABLE

For shapes used as beams

S_x

F_y = 50 ksi			S_x	Shape	Depth d	F_y'	F_y = 36 ksi		
L_c	L_u	M_R					L_c	L_u	M_R
Ft.	Ft.	Kip-ft.	In.^{3}		In.	Ksi	Ft.	Ft.	Kip-ft.
10.6	**14.1**	**2160**	**785**	**W 40 × 12 × 211**	**39 3/8**	**—**	**12.5**	**19.7**	**1570**
14.1	**14.5**	**2120**	**769**	**W 40 × 16 × 199**	**38 5/8**	**—**	**16.6**	**20.1**	**1540**
14.2	19.8	2080	757	W 33 × 15.75 × 221	33 7/8	—	16.7	27.5	1510
11.0	33.3	2060	748	WTM 26 × 12 × 289	27 5/8	—	13.0	46.2	1500
13.5	24.0	2050	746	WTM 30 × 15 × 235	31 1/4	—	15.9	33.4	1490
10.9	28.6	2040	742	WTM 28 × 12 × 270	29 1/8	—	12.9	39.7	1480
12.8	29.1	2040	742	WTM 27 × 14 × 258	29	—	15.1	40.4	1480
9.5	26.6	2000	729	WTM 27 × 10 × 271	29 7/8	—	11.2	36.9	1460
9.8	21.8	2000	727	WTM 30 × 10.5 × 246	32 1/8	—	11.5	30.2	1450
10.9	15.0	1980	719	W 36 × 12 × 210	36 3/4	—	12.9	20.9	1440
10.7	20.9	1980	719	WTM 32 × 12 × 234	32 1/4	—	12.6	29.0	1440
11.9	34.7	1970	718	WTM 24 × 12.75 × 279	26 3/4	—	14.0	48.2	1440
10.5	17.7	1960	714	WTM 33 × 11.5 × 219	34 1/2	—	12.3	24.6	1430
12.8	**12.8**	**1890**	**708**	**W 40 × 18 × 192**	**38 1/4**	**37.1**	**17.8**	**19.7**	**1410**
14.1	17.9	1880	684	W 33 × 15.75 × 201	33 5/8	—	16.6	24.9	1370
10.6	**12.3**	**1870**	**682**	**W 40 × 12 × 183**	**39**	**—**	**12.5**	**17.1**	**1360**
10.9	30.7	1870	680	WTM 26 × 12 × 264	27 1/4	—	12.9	42.6	1360
10.8	26.4	1870	680	WTM 28 × 12 × 247	28 7/8	—	12.8	36.7	1360
12.7	26.6	1850	674	WTM 27 × 14 × 235	28 5/8	—	15.0	36.9	1350
9.7	20.0	1830	665	WTM 30 × 10.5 × 226	31 7/8	—	11.4	27.8	1330
10.9	13.9	1830	664	W 36 × 12 × 194	36 1/2	—	12.8	19.4	1330
13.5	21.4	1820	663	W 30 × 15 × 211	31	—	15.9	29.7	1330
9.4	24.4	1820	662	WTM 27 × 10 × 247	29 1/2	—	11.1	33.9	1320
10.4	16.5	1820	662	WTM 33 × 11.5 × 204	34 1/4	—	12.3	22.9	1320
11.8	31.5	1770	644	WTM 24 × 12.75 × 250	26 3/8	—	13.9	43.8	1290
11.4	**11.4**	**1740**	**636**	**W 40 × 16 × 174**	**38 1/4**	**46.9**	**15.8**	**17.4**	**1270**
12.6	24.8	1720	624	WTM 27 × 14 × 217	28 3/8	—	14.9	34.5	1250
10.9	28.4	1720	624	WTM 26 × 12 × 241	26 7/8	—	12.8	39.4	1250
10.8	13.1	1710	623	W 36 × 12 × 182	36 3/8	—	12.7	18.2	1250
10.8	24.3	1710	621	WTM 28 × 12 × 226	28 1/2	—	12.7	33.7	1240
10.9	32.7	1680	612	WTM 24 × 12 × 253	25 3/8	—	12.9	45.4	1220
10.4	15.2	1670	607	WTM 33 × 11.5 × 187	34	—	12.2	21.1	1210
9.6	18.3	1660	605	WTM 30 × 10.5 × 207	31 1/2	—	11.3	25.4	1210
10.5	**10.5**	**1650**	**599**	**W 40 × 12 × 167**	**38 5/8**	**—**	**12.5**	**14.5**	**1200**
13.5	19.4	1640	598	W 30 × 15 × 191	30 5/8	—	15.9	26.9	1200
9.3	22.1	1630	593	WTM 27 × 10 × 221	29 1/8	—	11.0	30.7	1190
11.7	29.1	1620	588	WTM 24 × 12.75 × 229	26	—	13.8	40.4	1180
10.8	12.2	1600	580	W 36 × 12 × 170	36 1/8	—	12.7	16.9	1160
8.7	26.3	1580	574	WTM 24 × 9 × 239	27	—	10.2	36.5	1150
10.8	26.1	1570	569	WTM 26 × 12 × 221	26 5/8	—	12.7	36.3	1140
11.4	35.7	1570	569	WTM 21 × 12.25 × 248	23 3/4	—	13.5	49.6	1140
12.6	22.3	1530	556	WTM 27 × 14 × 194	28 1/8	—	14.8	31.0	1110
10.9	29.7	1510	550	WTM 24 × 12 × 228	24 7/8	—	12.8	41.2	1100
10.3	13.8	1510	549	WTM 33 × 11.5 × 169	33 7/8	—	12.1	19.2	1100
11.0	35.1	1510	548	WTM 22 × 12 × 245	23 3/8	—	12.9	48.7	1100
9.5	16.6	1490	543	WTM 30 × 10.5 × 185	31 1/4	—	11.2	23.0	1090

S_x ALLOWABLE STRESS DESIGN SELECTION TABLE

For shapes used as beams

F_y = 50 ksi			S_x	Shape	Depth d	F_y'	F_y = 36 ksi		
L_c	L_u	M_R					L_c	L_u	M_R
Ft.	Ft.	Kip-ft.	In.^{3}		In.	Ksi	Ft.	Ft.	Kip-ft
10.7	**11.3**	**1490**	**542**	**W 36 × 12 × 160**	**36**	—	**12.7**	**15.7**	**1080**
9.3	20.2	1480	540	WTM 27 × 10 × 201	28 7/8	—	10.9	28.1	1080
13.4	17.5	1480	539	W 30 × 15 × 173	30 1/2	—	15.8	24.3	1080
11.7	26.5	1460	531	WTM 24 × 12.75 × 207	25 3/4	—	13.7	36.8	1060
8.6	24.1	1430	521	WTM 24 × 9 × 218	26 5/8	—	10.1	33.5	1040
8.1	28.2	1410	514	WTM 22 × 8.5 × 236	25	—	9.5	39.2	1030
8.6	**8.6**	**1410**	**512**	**W 40 × 12 × 149**	**38 1/4**	—	**11.9**	**12.6**	**1020**
11.4	32.4	1400	510	WTM 21 × 12.25 × 223	23 3/8	—	13.4	45.0	1020
10.5	10.5	1390	504	W 36 × 12 × 150	35 7/8	—	12.6	14.5	1010
12.6	20.1	1380	502	W 27 × 14 × 178	27 3/4	—	14.9	27.9	1000
10.8	27.2	1370	499	WTM 24 × 12 × 207	24 1/8	—	12.7	37.8	998
11.6	24.7	1350	491	WTM 24 × 12.75 × 192	25 1/2	—	13.7	34.4	982
9.2	18.5	1340	488	WTM 27 × 10 × 182	28 1/2	—	10.8	25.6	975
10.4	12.1	1340	487	W 33 × 11.5 × 152	33 1/2	—	12.2	16.9	974
9.5	14.8	1330	483	WTM 30 × 10.5 × 165	30 7/8	—	11.1	20.6	966
8.5	22.2	1310	475	WTM 24 × 9 × 198	26 1/4	—	10.0	30.9	949
8.0	26.0	1290	468	WTM 22 × 8.5 × 216	24 5/8	—	9.4	36.1	936
11.3	29.7	1270	461	WTM 21 × 12.25 × 201	23	—	13.3	41.2	922
10.8	29.9	1250	456	WTM 22 × 12 × 204	22 3/4	—	12.7	41.5	912
12.6	18.3	1250	455	W 27 × 14 × 161	27 5/8	—	14.8	25.4	910
10.7	24.9	1240	453	WTM 24 × 12 × 188	24 1/4	—	12.6	34.6	905
11.5	22.8	1240	450	WTM 24 × 12.75 × 176	25 1/4	—	13.6	31.7	900
10.3	**11.1**	**1230**	**448**	**W 33 × 11.5 × 141**	**33 1/4**	—	**12.2**	**15.4**	**895**
8.9	**8.9**	**1210**	**439**	**W 36 × 12 × 135**	**35 1/2**	—	**12.3**	**13.0**	**877**
9.4	13.4	1200	436	WTM 30 × 10.5 × 148	30 5/8	—	11.1	18.7	871
8.4	20.4	1190	432	WTM 24 × 9 × 181	26	—	9.9	28.3	863
9.1	16.1	1160	424	WTM 27 × 10 × 159	28 1/8	—	10.7	22.4	847
7.9	23.7	1160	421	WTM 22 × 8.5 × 194	24 1/4	—	9.3	32.9	842
11.2	27.1	1150	417	WTM 21 × 12.25 × 182	22 3/4	—	13.2	37.7	833
11.6	21.1	1140	414	W 24 × 12.75 × 162	25	—	13.7	29.3	823
12.5	16.6	1130	411	W 27 × 14 × 146	27 3/8	—	14.7	23.0	822
9.9	**9.9**	**1120**	**406**	**W 33 × 11.5 × 130**	**33 1/8**	—	**12.1**	**13.8**	**811**
8.3	18.6	1070	390	WTM 24 × 9 × 163	25 5/8	—	9.8	25.8	771
7.8	21.8	1060	385	WTM 22 × 8.5 × 178	23 7/8	—	9.2	30.3	769
9.0	14.7	1050	383	WTM 27 × 10 × 143	27 7/8	—	10.6	20.4	766
11.1	25.0	1050	380	WTM 21 × 12.25 × 166	22 1/2	—	13.1	34.8	764
9.4	11.6	1050	380	W 30 × 10.5 × 132	30 1/4	—	11.1	16.1	764
10.3	32.8	1050	380	WTM 18 × 11 × 192	20 5/8	—	12.1	45.6	760
11.6	18.9	1020	371	W 24 × 12.75 × 146	24 3/4	—	13.6	26.3	74
8.6	**8.6**	**987**	**359**	**W 33 × 11.5 × 118**	**32 7/8**	—	**12.0**	**12.6**	**71**
9.4	10.8	976	355	W 30 × 10.5 × 124	30 1/8	—	11.1	15.0	71
8.3	16.7	958	348	WTM 24 × 9 × 146	25 5/8	—	9.7	23.3	69
7.7	19.9	957	348	WTM 22 × 8.5 × 161	23 5/8	—	9.1	27.6	69
9.0	13.3	947	345	WTM 27 × 10 × 129	27 5/8	—	10.6	18.4	68
10.2	30.1	947	344	WTM 18 × 11 × 175	20	—	12.0	41.8	68
11.2	21.7	905	329	W 21 × 12.25 × 147	22	—	13.2	30.2	65

ALLOWABLE STRESS DESIGN SELECTION TABLE

For shapes used as beams

S_x

F_y = 50 ksi			S_x	Shape	Depth d	F_y'	F_y = 36 ksi		
L_c	L_u	M_R					L_c	L_u	M_R
Ft.	Ft.	Kip-ft.	In.^{3}		In.	Ksi	Ft.	Ft.	Kip-ft.
9.4	**9.9**	**904**	**329**	**W 30 × 10.5 × 116**	**30**	—	**11.1**	**13.8**	**657**
11.5	16.8	903	329	W 24 × 12.75 × 131	24 1/2	—	13.6	23.3	657
7.7	18.2	865	315	WTM 22 × 8.5 × 146	23 1/4	—	9.0	25.2	629
10.1	27.5	852	310	WTM 18 × 11 × 158	19 3/4	—	11.9	38.2	619
8.2	14.8	839	305	WTM 24 × 9 × 128	25	—	9.6	20.6	610
8.9	**8.9**	**823**	**299**	**W 30 × 10.5 × 108**	**29 7/8**	—	**11.1**	**12.4**	**598**
9.0	11.4	823	299	W 27 × 10 × 114	27 1/4	—	10.6	15.9	598
11.1	19.7	812	295	W 21 × 12.25 × 132	21 7/8	—	13.1	27.3	590
11.5	14.9	801	291	W 24 × 12.75 × 117	24 1/4	—	13.5	20.8	582
7.6	16.7	790	287	WTM 22 × 8.5 × 133	23	—	9.0	23.2	574
10.0	25.3	775	282	WTM 18 × 11 × 143	19 1/2	—	11.8	35.2	564
8.1	13.4	755	275	WTM 24 × 9 × 115	24 3/4	—	9.6	18.6	549
11.1	18.3	751	273	W 21 × 12.25 × 122	21 5/8	—	13.1	25.4	546
7.9	**7.9**	**741**	**269**	**W 30 × 10.5 × 99**	**29 5/8**	—	**10.9**	**11.4**	**538**
9.0	10.2	735	267	W 27 × 10 × 102	27 1/8	—	10.6	14.2	534
11.4	13.2	709	258	W 24 × 12.75 × 104	24	58.5	13.5	18.4	516
10.0	23.2	703	256	WTM 18 × 11 × 130	19 1/4	—	11.8	32.2	511
7.5	14.8	696	253	WTM 22 × 8.5 × 118	22 3/4	—	8.9	20.6	506
11.1	16.7	683	249	W 21 × 12.25 × 111	21 1/2	—	13.0	23.2	497
8.1	12.0	672	245	WTM 24 × 9 × 103	24 1/2	—	9.5	16.6	489
8.9	**9.2**	**668**	**243**	**W 27 × 10 × 94**	**26 7/8**	—	**10.5**	**12.8**	**485**
10.1	21.0	634	231	W 18 × 11 × 119	19	—	11.9	29.1	461
11.0	15.3	623	227	W 21 × 12.25 × 101	21 3/8	—	13.0	21.3	453
8.1	10.9	610	222	W 24 × 9 × 94	24 1/4	—	9.6	15.1	444
8.0	**8.0**	**586**	**213**	**W 27 × 10 × 84**	**26 3/4**	—	**10.5**	**11.1**	**426**
10.0	18.7	561	204	W 18 × 11 × 106	18 3/4	—	11.8	26.0	408
8.1	**9.6**	**540**	**196**	**W 24 × 9 × 84**	**24 1/8**	—	**9.5**	**13.3**	**392**
7.5	12.1	526	192	W 21 × 8.25 × 93	21 5/8	—	8.9	16.8	383
13.1	31.7	522	190	W 14 × 14.5 × 120	14 1/2	—	15.5	44.1	380
10.0	17.4	516	188	W 18 × 11 × 97	18 5/8	—	11.8	24.1	375
8.1	**8.5**	**482**	**176**	**W 24 × 9 × 76**	**23 7/8**	—	**9.5**	**11.8**	**351**
9.3	20.2	481	175	W 16 × 10.25 × 100	17	—	11.0	28.0	350
13.1	29.2	475	173	W 14 × 14.5 × 109	14 3/8	58.6	15.4	40.6	345
7.5	10.9	470	171	W 21 × 8.25 × 83	21 3/8	—	8.8	15.1	341
9.9	15.5	456	166	W 18 × 11 × 86	18 3/8	—	11.7	21.5	332
13.0	26.7	430	157	W 14 × 14.5 × 99	14 1/8	48.5	15.4	37.1	313
9.3	18.0	426	155	W 16 × 10.25 × 89	16 3/4	—	10.9	25.1	310
7.4	**7.4**	**423**	**154**	**W 24 × 9 × 68**	**23 3/4**	—	**9.5**	**10.2**	**308**
7.4	9.6	415	151	W 21 × 8.25 × 73	21 1/4	—	8.8	13.4	301
9.9	13.7	402	146	W 18 × 11 × 76	18 1/4	64.2	11.6	19.1	292
13.0	24.5	383	143	W 14 × 14.5 × 90	14	40.4	15.3	34.0	285
7.4	**8.9**	**385**	**140**	**W 21 × 8.25 × 68**	**21 1/8**	—	**8.7**	**12.4**	**280**
9.2	15.8	368	134	W 16 × 10.25 × 77	16 1/2	—	10.9	21.9	268

S_x

ALLOWABLE STRESS DESIGN SELECTION TABLE

For shapes used as beams

F_y = 50 ksi			S_x	Shape	Depth d	F_y	F_y = 36 ksi		
L_c	L_u	M_R					L_c	L_u	M_R
Ft.	Ft.	Kip-ft.	In.^{3}		In.	Ksi	Ft.	Ft.	Kip-ft.
5.8	**5.8**	**365**	**133**	**W 24 × 7 × 62**	**23 3/4**	**—**	**7.4**	**8.1**	**265**
6.8	11.2	348	127	W 18 × 7.5 × 71	18 1/2	—	8.1	15.5	253
7.4	**8.0**	**348**	**127**	**W 21 × 8.25 × 62**	**21**	**—**	**8.7**	**11.2**	**253**
9.1	20.2	338	123	W 14 × 10 × 82	14 1/4	—	10.7	28.0	246
10.9	26.1	324	118	W 12 × 12 × 87	12 1/2	—	12.8	36.3	236
9.2	13.9	321	117	W 16 × 10.25 × 67	16 3/8	—	10.8	19.3	233
6.8	10.3	321	117	W 18 × 7.5 × 65	18 3/8	—	8.0	14.4	233
5.0	**5.0**	**319**	**116**	**W 24 × 7 × 55**	**23 5/8**	**—**	**6.9**	**7.4**	**232**
9.0	18.6	308	112	W 14 × 10 × 74	14 1/8	—	10.6	25.8	224
5.9	6.7	306	111	W 21 × 6.5 × 57	21	—	6.9	9.4	222
6.8	9.6	296	108	W 18 × 7.5 × 60	18 1/4	—	8.0	13.3	215
10.8	23.9	294	107	W 12 × 12 × 79	12 3/8	62.6	12.8	33.2	214
9.0	17.2	283	103	W 14 × 10 × 68	14	—	10.6	23.8	205
6.7	**8.7**	**270**	**98.3**	**W 18 × 7.5 × 55**	**18 1/8**	**—**	**7.9**	**12.1**	**196**
10.8	22.0	267	97.4	W 12 × 12 × 72	12 1/4	52.3	12.7	30.5	194
5.6	**5.6**	**261**	**94.9**	**W 21 × 6.5 × 50**	**20 7/8**	**—**	**6.9**	**7.8**	**189**
6.4	10.3	253	92.2	W 16 × 7 × 57	16 3/8	—	7.5	14.3	184
9.0	15.5	253	92.2	W 14 × 10 × 61	13 7/8	—	10.6	21.5	184
6.7	**7.9**	**244**	**88.9**	**W 18 × 7.5 × 50**	**18**	**—**	**7.9**	**11.0**	**177**
10.7	20.0	237	87.9	W 12 × 12 × 65	12 1/8	43.0	12.7	27.7	175
4.7	**4.7**	**225**	**82.0**	**W 21 × 6.5 × 44**	**20 5/8**	**—**	**6.6**	**6.9**	**164**
6.3	9.1	222	81.0	W 16 × 7 × 50	16 1/4	—	7.5	12.7	162
5.4	6.8	217	79.0	*W 18 × 6 × 46	18	—	6.4	9.4	157
9.0	17.5	214	78.0	W 12 × 10 × 58	12 1/4	—	10.6	24.3	156
7.2	12.7	213	77.8	*W 14 × 8 × 53	13 7/8	—	8.5	17.7	155
6.3	8.2	199	72.7	W 16 × 7 × 45	16 1/8	—	7.4	11.4	145
9.0	15.9	194	70.6	W 12 × 10 × 53	12	55.9	10.6	22.1	141
7.2	11.5	193	70.3	*W 14 × 8 × 48	13 3/4	—	8.5	16.0	140
5.4	**5.9**	**188**	**68.5**	***W 18 × 6 × 40**	**17 7/8**	**—**	**6.3**	**8.2**	**137**
9.0	22.4	183	66.7	W 10 × 10 × 60	10 1/4	—	10.6	31.1	133
6.3	**7.4**	**177**	**64.7**	**W 16 × 7 × 40**	**16**	**—**	**7.4**	**10.2**	**129**
7.2	14.1	177	64.7	*W 12 × 8 × 50	12 1/4	—	8.5	19.6	129
7.2	10.3	172	62.7	*W 14 × 8 × 43	13 5/8	—	8.4	14.4	125
9.0	20.4	165	60.0	W 10 × 10 × 54	10 1/8	63.5	10.6	28.3	120
7.2	12.8	159	58.1	*W 12 × 8 × 45	12	—	8.5	17.8	116
4.8	**4.8**	**158**	**57.8**	***W 18 × 6 × 35**	**17 3/4**	**—**	**6.3**	**6.7**	**115**
6.3	6.3	155	56.5	W 16 × 7 × 36	15 7/8	64.0	7.4	8.8	113
6.1	8.2	150	54.6	W 14 × 6.75 × 38	14 1/8	—	7.1	11.4	109
9.0	18.7	150	54.6	W 10 × 10 × 49	10	53.0	10.6	26.0	109
7.2	11.5	142	51.9	*W 12 × 8 × 40	12	—	8.4	16.0	103
7.2	16.4	135	49.1	W 10 × 8 × 45	10 1/8	—	8.5	22.8	98

* Presently not available in our rolling program.

ALLOWABLE STRESS DESIGN SELECTION TABLE

For shapes used as beams

S_x

F_y = 50 ksi			S_x	Shape	Depth d	F_y'	F_y = 36 ksi		
L_c	L_u	M_R					L_c	L_u	M_R
Ft.	Ft.	Kip-ft.	In.^{3}		In.	Ksi	Ft.	Ft.	Kip-ft.
6.0	**7.3**	**133**	**48.6**	**W 14 × 6.75 × 34**	**14**	**—**	**7.1**	**10.2**	**97**
4.9	**5.1**	**130**	**47.3**	***W 16 × 5.5 × 31**	**15 7/8**	**—**	**5.8**	**7.1**	**94**
5.9	9.1	125	45.6	W 12 × 6.5 × 35	12 1/2	—	6.9	12.6	91
7.2	14.2	115	42.1	W 10 × 8 × 39	9 7/8	—	8.4	19.8	84
6.0	**6.2**	**115**	**42.0**	**W 14 × 6.75 × 30**	**13 7/8**	**55.3**	**7.1**	**8.7**	**83**
5.8	**7.7**	**106**	**38.6**	**W 12 × 6.5 × 30**	**12 3/8**	**—**	**6.9**	**10.8**	**77**
4.0	**4.0**	**106**	**38.6**	***W 16 × 5.5 × 26**	**15 3/4**	**—**	**5.6**	**6.0**	**77**
4.5	5.1	97	35.4	*W 14 × 5 × 26	13 7/8	—	5.3	7.0	70
7.1	11.9	96	35.0	W 10 × 8 × 33	9 3/4	50.5	8.4	16.5	70
5.8	**6.7**	**91**	**33.4**	**W 12 × 6.5 × 26**	**12 1/4**	**57.9**	**6.9**	**9.3**	**66**
5.2	9.4	89	32.4	W 10 × 5.75 × 30	10 1/2	—	6.1	13.1	64
7.2	16.3	85	31.2	W 8 × 8 × 35	8 1/8	64.4	8.5	22.6	62
4.1	**4.1**	**80**	**29.1**	***W 14 × 5 × 22**	**13 3/4**	**—**	**5.3**	**5.6**	**58**
5.2	8.2	76	27.9	W 10 × 5.75 × 26	10 3/8	—	6.1	11.4	55
7.2	14.5	75	27.5	W 8 × 8 × 31	8	50.0	8.4	20.1	54
3.6	**4.6**	**69**	**25.4**	***W 12 × 4 × 22**	**12 1/4**	**—**	**4.3**	**6.4**	**50**
5.9	12.6	66	24.3	W 8 × 6.5 × 28	8	—	6.9	17.5	48
5.2	6.8	63	23.2	W 10 × 5.75 × 22	10 1/8	—	6.1	9.4	46
3.6	**3.8**	**58**	**21.3**	***W 12 × 4 × 19**	**12 1/8**	**—**	**4.2**	**5.3**	**42**
5.8	10.9	57	20.9	W 8 × 6.5 × 24	7 7/8	64.1	6.9	15.2	41
3.6	5.2	51	18.8	*W 10 × 4 × 19	10 1/4	—	4.2	7.2	37
4.7	8.5	49	18.2	W 8 × 5.25 × 21	8 1/4	—	5.6	11.8	36
2.9	**2.9**	**47**	**17.1**	***W 12 × 4 × 16**	**12**	**—**	**4.1**	**4.3**	**34**
3.6	4.4	44	16.2	*W 10 × 4 × 17	10 1/8	—	4.2	6.1	32
4.7	7.1	41	15.2	W 8 × 5.25 × 18	8 1/8	—	5.5	9.9	30
2.5	**2.5**	**40**	**14.9**	***W 12 × 4 × 14**	**11 7/8**	**54.3**	**3.5**	**4.2**	**29**
3.6	3.6	37	13.8	*W 10 × 4 × 15	10	—	4.2	5.0	27
5.4	11.8	36	13.4	W 6 × 6 × 20	6 1/4	62.1	6.4	16.4	26
3.6	5.2	32	11.8	*W 8 × 4 × 15	8 1/8	—	4.2	7.2	23
2.8	**2.8**	**29**	**10.9**	***W 10 × 4 × 12**	**9 7/8**	**47.5**	**3.9**	**4.3**	**21**
3.6	8.7	28	10.2	*W 6 × 4 × 16	6 1/4	—	4.3	12.0	20
3.6	4.3	27	9.91	*W 8 × 4 × 13	8	—	4.2	5.9	19
5.4	8.7	25	9.72	W 6 × 6 × 15	6	31.8	6.3	12.0	19
4.5	12.0	23	8.55	W 5 × 5 × 16	5	—	5.3	16.6	17
3.4	**3.4**	**21**	**7.81**	***W 8 × 4 × 10**	**7 7/8**	**45.8**	**4.2**	**4.7**	**15**
3.6	6.2	20	7.31	*W 6 × 4 × 12	6	—	4.2	8.6	14
3.5	**4.8**	**15**	**5.56**	***W 6 × 4 × 9**	**5 7/8**	**50.3**	**4.2**	**6.6**	**11**
3.5	12.2	14	5.26	M 4 × 4 × 13	4	—	4.2	16.9	10

* Presently not available in our rolling program

Z_x

PLASTIC DESIGN SELECTION TABLE
For W and WTM shapes

F_y = 50 ksi		A	Z_x	Shape	$\frac{d}{t_w}$	r_x	r_y	F_y = 36 ksi	
M_p	P_y							M_p	P_y
Kip-ft.	Kip	In.^{2}	In.^{3}			In.	In.	Kip-ft.	Kip.
15900	**12400**	**249**	**3830**	**WTM 36 × 16.5 × 848**	**16.8**	**16.4**	**4.27**	**11500**	**8960**
14900	**11700**	**234**	**3570**	**WTM 36 × 16.5 × 798**	**17.6**	**16.4**	**4.24**	**10700**	**8420**
13300	**10500**	**211**	**3190**	**WTM 36 × 16.5 × 720**	**19.0**	**16.2**	**4.18**	**9560**	**7600**
12700	**9600**	**192**	**3060**	**WTM 40 × 16 × 655**	**22.1**	**17.2**	**3.86**	**9180**	**6910**
11800	**9500**	**190**	**2840**	**WTM 36 × 16.5 × 650**	**20.5**	**16.0**	**4.12**	**8520**	**6840**
11500	**8700**	**174**	**2750**	**WTM 40 × 16 × 593**	**24.0**	**17.0**	**3.81**	**8260**	**6260**
10700	9050	181	2560	WTM 33 × 15.75 × 619	19.5	15.2	3.98	7690	6520
10600	**8600**	**172**	**2550**	**WTM 36 × 16.5 × 588**	**22.3**	**15.9**	**4.07**	**7650**	**6190**
10400	**8200**	**164**	**2500**	**WTM 40 × 12 × 561**	**22.1**	**16.6**	**2.82**	**7490**	**5900**
10200	**7800**	**156**	**2450**	**WTM 40 × 16 × 531**	**26.3**	**16.9**	**3.75**	**7350**	**5620**
9730	8300	166	2330	WTM 33 × 15.75 × 567	20.9	15.1	3.94	7000	5980
9720	8050	161	2330	WTM 36 × 12 × 548	20.8	15.7	2.93	7000	5800
9600	**7600**	**152**	**2300**	**WTM 40 × 12 × 520**	**23.6**	**16.5**	**2.78**	**6910**	**5470**
9440	7700	154	2270	WTM 36 × 16.5 × 527	24.4	15.8	4.02	6800	5540
9210	8500	170	2210	WTM 30 × 15 × 581	18.0	13.9	3.86	6630	6120
9090	**7000**	**140**	**2180**	**WTM 40 × 16 × 480**	**28.6**	**16.8**	**3.72**	**6540**	**5040**
8940	7450	149	2140	WTM 36 × 12 × 508	22.2	15.6	2.90	6430	5360
8790	7550	151	2110	WTM 33 × 15.75 × 515	22.6	14.9	3.89	6330	5440
8710	**6950**	**139**	**2090**	**WTM 40 × 12 × 475**	**25.2**	**16.4**	**2.74**	**6270**	**5000**
8640	7100	142	2070	WTM 36 × 16.5 × 485	25.8	15.6	3.98	6220	5110
8570	7600	152	2060	WTM 33 × 11.5 × 520	19.5	14.7	2.88	6170	5470
8280	7700	154	1990	WTM 30 × 15 × 526	19.4	13.8	3.80	5960	5540
8270	**6400**	**128**	**1980**	**WTM 40 × 16 × 436**	**30.9**	**16.6**	**3.67**	**5950**	**4610**
8080	6800	136	1940	WTM 36 × 12 × 464	23.7	15.5	2.85	5820	4900
7990	7500	150	1920	WTM 32 × 12 × 511	18.3	13.8	2.96	5750	5400
7980	6400	128	1910	WTM 40 × 12 × 437	27.0	16.3	2.69	5740	4610
7900	6850	137	1890	WTM 33 × 15.75 × 468	24.2	14.8	3.85	5680	4930
7840	7900	158	1880	WTM 27 × 14 × 539	16.5	12.7	3.66	5640	5690
7780	6950	139	1870	WTM 33 × 11.5 × 476	21.0	14.6	2.84	5600	5000
7730	6400	128	1860	WTM 36 × 16.5 × 439	28.1	15.6	3.95	5570	4610
7470	7000	140	1790	WTM 30 × 15 × 477	21.0	13.7	3.75	5380	5040
7450	**5800**	**116**	**1790**	**WTM 40 × 16 × 397**	**33.6**	**16.6**	**3.65**	**5370**	**4180**
7390	6250	125	1770	WTM 36 × 12 × 426	25.4	15.4	2.82	5320	4500
7190	5800	116	1720	WTM 40 × 12 × 396	29.3	16.2	2.66	5170	4180
7160	6950	139	1720	WTM 30 × 10.5 × 475	18.0	13.4	2.67	5160	5000
7130	7250	145	1710	WTM 27 × 14 × 494	17.7	12.6	3.61	5140	5220
7120	6750	135	1710	WTM 32 × 12 × 462	19.7	13.7	2.92	5120	4860
7100	6200	124	1700	WTM 33 × 15.75 × 424	26.3	14.7	3.81	5110	4460
7000	6300	126	1680	WTM 33 × 11.5 × 432	22.6	14.5	2.79	5040	4540
6920	**5750**	**115**	**1660**	**WTM 36 × 16,5 × 393**	**31,0**	**15.5**	**3.90**	**4980**	**4140**
6890	10700	214	1650	W 14 × 16 × 730	7.3	8.19	4.69	4960	7700
6790	7100	142	1630	WTM 28 × 12 × 485	16.3	12.3	3.05	4890	5110

PLASTIC DESIGN SELECTION TABLE
For W and WTM shapes

Z_x

F_y = 50 ksi		A	Z_x	Shape	$\frac{d}{t_w}$	r_x	r_y	F_y = 36 ksi	
M_p	P_y							M_p	P_y
Kip-ft.	Kip	In.^{2}	In.^{3}			In.	In.	Kip-ft.	Kip.
6770	**5300**	**106**	**1630**	**WTM 40 × 16 × 362**	**36.2**	**16.5**	**3.61**	**4880**	**3820**
6710	6350	127	1610	WTM 30 × 15 × 433	22.4	13.5	3.71	4830	4570
6630	5650	113	1590	WTM 36 × 12 × 387	27.5	15.3	2.78	4770	4070
6490	6350	127	1560	WTM 30 × 10.5 × 435	19.3	13.3	2.62	4670	4570
6460	5850	117	1550	WTM 33 × 11.5 × 398	24.0	14.3	2.74	4650	4210
6450	7200	144	1550	WTM 24 × 12.75 × 492	15.1	11.5	3.41	4650	5180
6450	**5250**	**105**	**1550**	**WTM 40 × 12 × 359**	**31.7**	**16.1**	**2.62**	**4650**	**3780**
6440	5650	113	1550	WTM 33 × 15.75 × 387	28.5	14.7	3.79	4640	4070
6380	6550	131	1530	WTM 27 × 14 × 448	19.0	12.5	3.57	4590	4720
6370	6100	122	1530	WTM 32 × 12 × 418	21.3	13.6	2.87	4590	4390
6290	* **4820**	**96.4**	**1510**	**W 40 × 18 × 328**	**44.0**	**16.7**	**4.15**	**4530**	* **3470**
6280	5250	105	1510	WTM 36 × 16.5 × 359	33.4	15.4	3.87	4520	3780
6220	6900	138	1490	WTM 26 × 12 × 473	15.4	11.6	3.10	4480	4970
6140	9750	195	1470	W 14 × 16 × 665	7.6	7.99	4.62	4420	7020
6140	6500	130	1470	WTM 27 × 10 × 446	16.5	12.3	2.61	4420	4680
6080	* **4770**	**95.3**	**1460**	**WTM 40 × 16 × 324**	**40.2**	**16.4**	**3.57**	**4380**	**3430**
6060	6400	128	1450	WTM 28 × 12 × 438	17.6	12.2	3.00	4360	4610
5960	5700	114	1430	WTM 30 × 15 × 391	24.4	13.5	3.68	4290	4100
5930	5100	102	1420	WTM 36 × 12 × 350	29.7	15.2	2.75	4270	3670
5900	5200	104	1420	WTM 33 × 15.75 × 354	30.6	14.5	3.74	4250	3740
5900	4800	96.0	1420	WTM 40 × 12 × 327	34.6	16.0	2.59	4250	3460
5860	6600	132	1410	WTM 24 × 12.75 × 450	16.1	11.4	3.36	4220	4750
5820	5750	115	1400	WTM 30 × 10.5 × 394	20.8	13.2	2.58	4190	4140
5750	* 4820	96.4	1380	WTM 36 × 16.5 × 328	36.4	15.3	3.84	4140	3470
5740	5550	111	1380	WTM 32 × 12 × 380	22.8	13.4	2.83	4130	4000
5740	5250	105	1380	WTM 33 × 11.5 × 361	26.0	14.3	2.72	4130	3780
5730	5950	119	1380	WTM 27 × 14 × 407	20.3	12.3	3.52	4130	4280
5700	* **4380**	**87.6**	**1370**	**W 40 × 18 × 298**	**47.8**	**16.6**	**4.12**	**4100**	* **3150**
5690	6700	134	1360	WTM 24 × 12 × 457	14.5	10.9	3.14	4090	4820
5580	6250	125	1340	WTM 26 × 12 × 427	16.5	11.5	3.05	4020	4500
5580	5950	119	1340	WTM 27 × 10 × 407	17.7	12.2	2.56	4010	4280
5540	* **4370**	**87.4**	**1330**	**WTM 40 × 16 × 297**	**42.8**	**16.3**	**3.54**	**3990**	* **3150**
5460	8850	177	1310	W 14 × 16 × 605	8.1	7.82	4.56	3930	6370
5440	5800	116	1310	WTM 28 × 12 × 397	19.0	12.1	2.95	3920	4180
5430	4680	93.5	1300	WTM 36 × 12 × 318	32.4	15.1	2.71	3910	3370
5420	5200	104	1300	WTM 30 × 15 × 357	26.5	13.4	3.65	3900	3740
5310	4880	97.5	1280	WTM 33 × 11.5 × 332	27.7	14.1	2.67	3830	3510
5280	4670	93.5	1270	WTM 33 × 15.75 × 318	33.8	14.4	3.71	3800	3370
5280	* **4320**	**86.3**	**1270**	**WTM 40 × 12 × 294**	**38.1**	**15.9**	**2.56**	**3800**	**3110**
5270	5250	105	1270	WTM 30 × 10.5 × 358	22.2	13.0	2.53	3800	3780
5240	* 4410	88.3	1260	W 36 × 16.5 × 300	38.9	15.2	3.83	3770	3180
5220	5950	119	1250	WTM 24 × 12.75 × 408	17.3	11.3	3.33	3760	4280

* Check shape for compliance with Formulas (2.7-1 a) or (2.7-1 b), Sect. 2.7, AISC Specification, as applicable, when subjected to combined axial force and bending moment at ultimate loading.

Z_x PLASTIC DESIGN SELECTION TABLE
For W and WTM shapes

F_y = 50 ksi		A	Z_x	Shape	$\frac{d}{t_w}$	r_x	r_y	F_y = 36 ksi	
M_p	P_y							M_p	P_y
Kip-ft.	Kip	In.^{2}	In.^{3}			In.	In.	Kip-ft.	Kip.
5200	* **4070**	**81.3**	**1250**	**W 40 × 16 × 277**	**47.8**	**16.4**	**3.58**	**3740**	* **2930**
5170	5400	108	1240	WTM 27 × 14 × 368	22.0	12.2	3.48	3720	3890
5130	5000	100	1230	WTM 32 × 12 × 343	24.8	13.4	2.79	3700	3600
5100	* **3940**	**78.8**	**1220**	**W 40 × 18 × 268**	**52.5**	**16.5**	**4.09**	**3670**	* **2840**
5060	6050	121	1210	WTM 24 × 12 × 414	15.5	10.8	3.09	3640	4360
5020	5400	108	1200	WTM 27 × 10 × 369	19.0	12.1	2.51	3610	3890
4990	5650	113	1200	WTM 26 × 12 × 387	17.8	11.4	3.00	3590	4070
4960	4780	95.7	1190	WTM 30 × 15 × 326	28.4	13.2	3.61	3570	3440
4870	* 4120	82.4	1170	W 36 × 16.5 × 280	41.3	15.1	3.81	3510	2970
4870	8050	161	1170	W 14 × 16 × 550	8.5	7.65	4.50	3500	5800
4860	4200	84.0	1170	WTM 36 × 12 × 286	35.7	15.0	2.68	3500	3030
4860	5250	105	1170	WTM 28 × 12 × 360	20.3	12.0	2.91	3500	3780
4810	4430	88.6	1150	WTM 33 × 11.5 × 302	30.2	14.1	2.65	3460	3190
4810	4280	85.6	1150	WTM 33 × 15.75 × 291	36.3	14.4	3.69	3460	3080
4740	4750	95.0	1140	WTM 30 × 10.5 × 323	24.1	12.9	2.49	3410	3420
4720	* **3880**	**77.6**	**1130**	**WTM 40 × 12 × 264**	**41.7**	**15.8**	**2.52**	**3400**	**2790**
4710	4600	92.0	1130	WTM 32 × 12 × 313	26.9	13.2	2.75	3390	3310
4700	5900	118	1130	WTM 21 × 12.25 × 402	15.0	10.2	3.27	3380	4250
4700	4930	98.7	1130	WTM 27 × 14 × 336	23.8	12.1	3.45	3380	3550
4680	5400	108	1120	WTM 24 × 12.75 × 370	18.4	11.1	3.28	3370	3890
4670	* **3660**	**73.3**	**1120**	**W 40 × 16 × 249**	**52.5**	**16.3**	**3.56**	**3360**	* **2640**
—	—	**71.7**	**1100**	**W 40 × 18 × 244**	**55.0**	**16.4**	**4.04**	**3300**	* **2580**
4560	5500	110	1090	WTM 24 × 12 × 375	16.6	10.6	3.04	3280	3960
4520	4920	98.3	1080	WTM 27 × 10 × 335	20.3	11.9	2.46	3250	3540
4500	5150	103	1080	WTM 26 × 12 × 351	19.0	11.2	2.95	3240	3710
4490	* 3820	76.5	1080	W - 36 × 16.5 × 260	43.2	15.0	3.78	3230	* 2750
4480	5750	115	1070	WTM 22 × 12 × 395	14.7	10.0	3.13	3220	4140
4420	4290	85.7	1060	WTM 30 × 15 × 292	31.4	13.2	3.58	3180	3090
4400	4780	95.5	1060	WTM 28 × 12 × 325	22.0	11.8	2.86	3170	3440
4330	* 3770	75.4	1040	WTM 36 × 12 × 256	39.0	14.9	2.65	3120	2710
4330	* 3870	77.4	1040	WTM 33 × 15.75 × 263	39.7	14.3	3.66	3120	2790
4320	7300	146	1040	W 14 × 16 × 500	8.9	7.50	4.44	3110	5260
4320	5150	103	1040	WTM 24 × 9 × 354	16.5	11.0	2.35	3110	3710
4300	3980	79.6	1030	WTM 33 × 11.5 × 271	33.2	14.0	2.62	3100	2870
4300	4330	86.6	1030	WTM 30 × 10.5 × 295	26.1	12.9	2.46	3090	3120
4280	4200	84.0	1030	WTM 32 × 12 × 286	28.9	13.1	2.72	3080	3020
4260	4510	90.2	1020	WTM 27 × 14 × 307	25.5	12.0	3.42	3070	3250
4240	4920	98.4	1020	WTM 24 × 12.75 × 335	19.9	11.0	3.23	3050	3540
4210	* **3450**	**68.9**	**1010**	**W 40 × 12 × 235**	**47.8**	**15.9**	**2.54**	**3030**	* **2480**
4210	* 3600	72.1	1010	W 36 × 16.5 × 245	45.1	15.0	3.75	3030	* 2590
4210	5350	107	1010	WTM 21 × 12.25 × 364	16.0	10.0	3.23	3030	3850
4090	5000	100	982	WTM 24 × 12 × 343	17.8	10.5	3.01	2950	3600
4050	4440	88.9	973	WTM 27 × 10 × 302	22.0	11.8	2.43	2920	3200
4040	4660	93.2	970	WTM 26 × 12 × 317	20.6	11.1	2.91	2910	3350

* Check shape for compliance with Formulas (2.7-1 a) or (2.7-1 b), Sect. 2.7, AISC Specification, as applicable when subjected to combined axial force and bending moment at ultimate loading.

PLASTIC DESIGN SELECTION TABLE
For W and WTM shapes

Z_x

F_y = 50 ksi		A	Z_x	Shape	$\frac{d}{t_w}$	r_x	r_y	F_y = 36 ksi	
M_p	P_y							M_p	P_y
Kip-ft.	Kip	In.^{2}	In.^{3}			In.	In.	Kip-ft.	Kip.
—	—	**64.8**	**967**	**W 40 × 18 × 221**	**54.5**	**16.0**	**3.90**	**2900**	* **2330**
4010	* **3170**	**63.3**	**963**	**W 40 × 16 × 215**	**60.0**	**16.2**	**3.54**	**2890**	* **2280**
4000	5200	104	961	WTM 22 × 12 × 357	15.8	9.87	3.09	2880	3740
3990	4350	87.0	957	WTM 28 × 12 × 296	23.8	11.8	2.83	2870	3130
3930	* 3380	67.6	943	W 36 × 16.5 × 230	47.2	14.9	3.73	2830	* 2440
3920	3840	76.7	941	WTM 30 × 15 × 261	34.0	13.1	3.54	2820	2760
3910	* 3540	70.9	939	W 33 × 15.75 × 241	41.2	14.1	3.63	2820	2550
3910	4690	93.7	938	WTM 24 × 9 × 319	17.8	10.8	2.29	2810	3370
3900	* 3410	68.1	936	WTM 36 × 12 × 232	42.7	14.8	2.62	2810	2450
3900	3960	79.1	935	WTM 30 × 10.5 × 269	28.0	12.8	2.43	2810	2850
3890	4130	82.6	933	WTM 27 × 14 × 281	27.6	12.0	3.40	2800	2980
3870	6650	133	929	W 14 × 16 × 455	9.4	7.35	4.39	2790	4790
3840	4490	89.8	922	WTM 24 × 12.75 × 306	21.5	10.9	3.20	2770	3230
3830	3570	71.4	919	WTM 33 × 11.5 × 243	36.3	13.9	2.58	2760	2570
3810	3760	75.2	915	WTM 32 × 12 × 256	32.0	13.1	2.68	2750	2710
3810	4890	97.9	915	WTM 21 × 12.25 × 333	17.1	9.91	3.19	2740	3520
3770	* **3100**	**62.0**	**905**	**W 40 × 12 × 211**	**52.5**	**15.8**	**2.51**	**2720**	* **2230**
3710	4560	91.2	891	WTM 24 × 12 × 310	19.2	10.4	2.96	2670	3280
3660	4240	84.9	878	WTM 26 × 12 × 289	22.3	11.0	2.88	2630	3060
3650	4780	95.6	877	WTM 22 × 12 × 326	16.9	9.73	3.03	2630	3440
—	—	**58.4**	**868**	**W 40 × 16 × 199**	**59.5**	**16.0**	**3.45**	**2600**	* **2100**
3610	3970	79.5	867	WTM 28 × 12 × 270	25.6	11.7	2.80	2600	2860
3610	6250	125	866	W 14 × 16 × 426	10.0	7.26	4.35	2600	4500
3600	3980	79.5	864	WTM 27 × 10 × 271	24.1	11.7	2.39	2590	2860
3560	* 3250	65.0	855	W 33 × 15.75 × 221	43.8	14.1	3.59	2570	* 2340
3550	3620	72.4	853	WTM 30 × 10.5 × 246	30.3	12.7	2.40	2560	2610
3540	3790	75.7	850	WTM 27 × 14 × 258	29.6	11.9	3.37	2550	2730
3530	4270	85.5	847	WTM 24 × 9 × 291	19.1	10.7	2.25	2540	3080
3520	* 3450	69.0	845	WTM 30 × 15 × 235	37.7	13.0	3.52	2530	2490
3480	4100	82.0	835	WTM 24 × 12.75 × 279	23.0	10.8	3.17	2510	2950
3470	* 3090	61.8	833	W 36 × 12 × 210	44.2	14.6	2.58	2500	* 2230
3470	3440	68.8	832	WTM 32 × 12 × 234	34.3	13.0	2.66	2500	2480
3440	* 3220	64.5	826	WTM 33 × 11.5 × 219	39.7	13.8	2.56	2480	2320
3400	4410	88.2	816	WTM 21 × 12.25 × 300	18.6	9.81	3.15	2450	3170
3340	5840	117	801	W 14 × 16 × 398	10.3	7.16	4.31	2400	4210
3310	3870	77.5	795	WTM 26 × 12 × 264	23.9	10.9	2.85	2380	2790
3310	4110	82.1	794	WTM 24 × 12 × 280	20.7	10.3	2.92	2380	2960
3290	3630	72.7	790	WTM 28 × 12 × 247	27.7	11.6	2.77	2370	2620
3270	4340	86.7	786	WTM 22 × 12 × 295	18.0	9.61	3.00	2360	3120
3260	3620	72.5	782	WTM 27 × 10 × 247	25.9	11.6	2.36	2340	2610

* Check shape for compliance with Formulas (2.7-1 a) or (2.7-1 b), Sect. 2.7, AISC Specification, as applicable, when subjected to combined axial force and bending moment at ultimate loading.

Z_x PLASTIC DESIGN SELECTION TABLE

For W and WTM shapes

F_y = 50 ksi		A	Z_x	Shape	$\frac{d}{t_w}$	r_x	r_y	F_y = 36 ksi	
M_p	P_y							M_p	P_y
Kip-ft.	Kip	In.^{2}	In.^{3}			In.	In.	Kip-ft.	Kip.
3260	* **2690**	**53.7**	**781**	**W 40 × 12 × 183**	**60.0**	**15.7**	**2.50**	**2340**	* **1930**
3240	3320	66.4	777	WTM 30 × 10.5 × 226	32.5	12.6	2.38	2330	2390
3210	* 2950	59.1	772	W 33 × 15.75 × 201	47.1	14.0	3.56	2310	* 2130
3200	3460	69.1	769	WTM 27 × 14 × 235	31.5	11.8	3.33	2310	2490
3190	* 2850	57.0	767	W 36 × 12 × 194	47.7	14.6	2.56	2300	* 2050
3180	* 2990	59.8	764	WTM 33 × 11.5 × 204	42.3	13.8	2.54	2290	2150
3170	3870	77.5	760	WTM 24 × 9 × 264	20.4	10.6	2.22	2280	2790
3140	4580	91.5	753	WTM 18 × 11 × 311	14.7	8.72	2.95	2260	3290
3120	* 3100	62.0	749	W 30 × 15 × 211	39.9	12.9	3.49	2250	2230
3100	3680	73.5	744	WTM 24 × 12.75 × 250	25.3	10.7	3.14	2230	2650
3090	4040	80.8	741	WTM 21 × 12.25 × 275	19.8	9.71	3.12	2220	2910
3040	5400	108	729	W 14 × 16 × 370	10.8	7.10	4.29	2190	3890
3020	3540	70.9	724	WTM 26 × 12 × 241	25.9	10.9	2.82	2170	2550
2990	3330	66.5	718	WTM 28 × 12 × 226	29.7	11.5	2.74	2160	2400
2990	* **2680**	**53.6**	**718**	**W 36 × 12 × 182**	**50.1**	**14.5**	**2.55**	**2150**	* **1930**
2980	3720	74.4	715	WTM 24 × 12 × 253	22.6	10.2	2.89	2140	2680
2960	3950	78.9	710	WTM 22 × 12 × 269	19.5	9.53	2.96	2130	2840
2950	3190	63.8	708	WTM 27 × 14 × 217	34.3	11.8	3.32	2120	2300
2940	3040	60.7	705	WTM 30 × 10.5 × 207	34.7	12.5	2.35	2110	2190
2910	* 2750	55.0	699	WTM 33 × 11.5 × 187	45.4	13.7	2.52	2100	* 1980
2900	3240	64.8	695	WTM 27 × 10 × 221	28.6	11.5	2.33	2080	2330
2880	* **2450**	**49.1**	**692**	**W 40 × 12 × 167**	**59.4**	**15.3**	**2.40**	**2080**	* **1770**
2850	3510	70.3	685	WTM 24 × 9 × 239	22.1	10.5	2.18	2050	2530
2820	4160	83.2	676	WTM 18 × 11 × 283	15.6	8.61	2.91	2030	2990
2810	3360	67.2	676	WTM 24 × 12.75 × 229	27.1	10.7	3.11	2030	2420
2800	* 2810	56.1	673	W 30 × 15 × 191	43.2	12.8	3.46	2020	* 2020
2780	* 2500	50.0	668	W 36 × 12 × 170	53.2	14.5	2.53	2010	* 1800
2780	5000	100	667	W 14 × 16 × 342	11.4	7.00	4.25	2000	3600
2760	3640	72.8	663	WTM 21 × 12.25 × 248	21.6	9.63	3.09	1990	2620
2740	3240	64.9	658	WTM 26 × 12 × 221	27.7	10.8	2.79	1970	2340
2670	3590	71.9	640	WTM 22 × 12 × 245	20.9	9.44	2.93	1920	2590
2660	3350	67.0	638	WTM 24 × 12 × 228	24.4	10.1	2.85	1910	2410
2630	2960	59.2	630	WTM 27 × 10 × 201	30.7	11.5	2.30	1890	2130
2620	* 2720	54.3	629	WTM 30 × 10.5 × 185	38.5	12.5	2.33	1890	1960
2620	* 2480	49.5	629	WTM 33 × 11.5 × 169	50.5	13.7	2.50	1890	* 1780
2620	* 2850	57.0	628	WTM 27 × 14 × 194	37.5	11.7	3.29	1890	2050
2600	* **2350**	**47.0**	**624**	**W 36 × 12 × 160**	**55.4**	**14.4**	**2.50**	**1870**	* **1690**
2580	3470	69.4	620	WTM 22 × 8.5 × 236	19.2	9.61	2.05	1860	2500
2570	3200	64.0	618	WTM 24 × 9 × 218	23.7	10.4	2.15	1850	2300
2540	3790	75.9	611	WTM 18 × 11 × 258	16.8	8.53	2.88	1830	2730
2530	3040	60.7	606	WTM 24 × 12.75 × 207	29.6	10.6	3.08	1820	2190
—	—	50.8	605	W 30 × 15 × 173	46.5	12.7	3.43	1820	* 1830
2510	4570	91.4	603	W 14 × 16 × 311	12.1	6.88	4.20	1810	3290
2510	4940	98.8	603	W 12 × 12 × 336	9.5	6.41	3.47	1810	3560

* Check shape for compliance with Formulas (2.7-1 a) or (2.7-1 b), Sect. 2.7, AISC Specification, as applicable when subjected to combined axial force and bending moment at ultimate loading.

PLASTIC DESIGN SELECTION TABLE
For W and WTM shapes

Z_x

F_y = 50 ksi		A	Z_x	Shape	$\frac{d}{t_w}$	r_x	r_y	F_y = 36 ksi	
M_p	P_y							M_p	P_y
Kip-ft.	Kip	In.^{2}	In.^{3}			In.	In.	Kip-ft.	Kip.
—	—	**43.8**	**597**	**W 40 × 12 × 149**	**60.6**	**14.9**	**2.29**	**1790**	* **1580**
2450	3270	65.4	589	WTM 21 × 12.25 × 223	23.4	9.54	3.05	1770	2350
2420	3280	65.7	582	WTM 22 × 12 × 223	22.6	9.38	2.91	1740	2360
2420	* 2210	44.2	581	W 36 × 12 × 150	57.4	14.3	2.47	1740	* 1590
2400	3050	60.9	576	WTM 24 × 12 × 207	26.5	10.0	2.82	1730	2190
2360	* 2610	52.3	567	W 27 × 14 × 178	38.4	11.6	3.26	1700	1880
2360	2670	53.5	567	WTM 27 × 10 × 182	33.5	11.4	2.28	1700	1920
2340	3180	63.5	562	WTM 22 × 8.5 × 216	20.5	9.52	2.02	1690	2290
2330	2910	58.3	560	WTM 24 × 9 × 198	25.7	10.3	2.13	1680	2100
2330	2820	56.3	559	WTM 24 × 12.75 × 192	31.4	10.5	3.07	1680	2030
2330	* 2240	44.7	559	W 33 × 11.5 × 152	52.7	13.5	2.47	1680	* 1610
2320	* 2420	48.5	558	WTM 30 × 10.5 × 165	42.3	12.4	2.30	1670	1740
2290	3440	68.8	549	WTM 18 × 11 × 234	18.2	8.44	2.85	1650	2480
2260	4160	83.3	542	W 14 × 16 × 283	13.0	6.79	4.17	1630	3000
2240	4480	89.6	537	W 12 × 12 × 305	10.0	6.29	3.42	1610	3230
2210	2960	59.2	530	WTM 21 × 12.25 × 201	25.3	9.47	3.02	1590	2130
2200	3000	60.0	527	WTM 22 × 12 × 204	24.2	9.31	2.88	1580	2160
2160	2770	55.3	519	WTM 24 × 12 × 188	28.6	9.97	2.80	1560	1990
2140	* **2080**	**41.6**	**514**	**W 33 × 11.5 × 141**	**55.0**	**13.4**	**2.43**	**1540**	* **1500**
2130	* 2370	47.4	512	W 27 × 14 × 161	41.8	11.5	3.24	1540	1710
2130	2580	51.7	511	WTM 24 × 12.75 × 176	33.7	10.5	3.04	1530	1860
—	—	**39.7**	**509**	**W 36 × 12 × 135**	**59.3**	**14.0**	**2.38**	**1530**	* **1430**
2110	2660	53.2	507	WTM 24 × 9 × 181	27.6	10.3	2.10	1520	1910
2090	2850	57.1	501	WTM 22 × 8.5 × 194	22.4	9.45	1.99	1500	2050
2080	* 2170	43.5	500	WTM 30 × 10.5 × 148	47.2	12.4	2.28	1500	* 1570
2040	3110	62.1	490	WTM 18 × 11 × 211	19.5	8.35	2.82	1470	2240
2040	* 2330	46.6	489	WTM 27 × 10 × 159	37.5	11.3	2.24	1470	1680
2030	3780	75.6	487	W 14 × 16 × 257	13.9	6.71	4.13	1460	2720
2010	4100	81.9	481	W 12 × 12 × 279	10.4	6.16	3.38	1440	2950
1980	2680	53.6	476	WTM 21 × 12.25 × 182	27.4	9.40	3.00	1430	1930
1950	2390	47.7	468	W 24 × 12.75 × 162	35.5	10.4	3.05	1400	1720
1940	* **1920**	**38.3**	**467**	**W 33 × 11.5 × 130**	**57.1**	**13.2**	**2.39**	**1400**	* **1380**
—	—	42.9	461	W 27 × 14 × 146	45.3	11.4	3.21	1380	* 1550
1900	2620	52.3	456	WTM 22 × 8.5 × 178	23.9	9.37	1.96	1370	1880
1900	2400	48.0	455	WTM 24 × 9 × 163	30.2	10.2	2.08	1370	1730
1840	2820	56.4	442	WTM 18 × 11 × 192	21.2	8.28	2.79	1330	2030
1830	* 2100	41.9	440	WTM 27 × 10 × 143	41.6	11.3	2.23	1320	1510
1820	* 1940	38.9	437	W 30 × 10.5 × 132	49.3	12.2	2.25	1310	* 1400
1820	3420	68.5	436	W 14 × 16 × 233	15.0	6.63	4.10	1310	2460
1800	2440	48.8	432	WTM 21 × 12.25 × 166	30.0	9.36	2.98	1300	1760
1780	3700	74.1	428	W 12 × 12 × 252	11.0	6.06	3.34	1280	2670
1740	* 2150	43.0	418	W 24 × 12.75 × 146	38.1	10.3	3.01	1250	1550

* Check shape for compliance with Formulas (2.7-1 a) or (2.7-1 b), Sect. 2.7, AISC Specification, as applicable, when subjected to combined axial force and bending moment at ultimate loading.

Z_x

PLASTIC DESIGN SELECTION TABLE
For W and WTM shapes

F_y = 50 ksi		A	Z_x	Shape	$\frac{d}{t_w}$	r_x	r_y	F_y = 36 ksi	
M_p	P_y							M_p	P_y
Kip-ft.	Kip	In.^{2}	In.^{3}			In.	In.	Kip-ft.	Kip.
—	—	**34.7**	**415**	**W 33 × 11.5 × 118**	**59.7**	**13.0**	**2.32**	**1240**	*** 1250**
1710	2370	47.4	410	WTM 22 × 8.5 × 161	25.9	9.31	1.93	1230	1710
1700	* 1820	36.5	408	W 30 × 10.5 × 124	51.6	12.1	2.23	1220	* 1310
1690	2150	43.0	405	WTM 24 × 9 × 146	32.9	10.1	2.05	1210	1550
1660	2570	51.3	398	WTM 18 × 11 × 175	22.5	8.20	2.76	1190	1850
1640	* 1890	37.8	395	WTM 27 × 10 × 129	45.3	11.2	2.21	1180	* 1360
1620	3100	62.0	390	W 14 × 16 × 211	16.0	6.55	4.07	1170	2230
1610	3390	67.7	386	W 12 × 12 × 230	11.7	5.97	3.31	1160	2440
1580	*** 1710**	**34.2**	**378**	**W 30 × 10.5 × 116**	**53.1**	**12.0**	**2.19**	**1140**	*** 1230**
1550	2160	43.2	373	W 21 × 12.25 × 147	30.6	9.17	2.95	1120	1560
1540	* 1930	38.5	370	W 24 × 12.75 × 131	40.5	10.2	2.97	1110	1390
1540	2150	42.9	369	WTM 22 × 8.5 × 146	28.0	9.23	1.90	1110	1550
1480	2320	46.3	356	WTM 18 × 11 × 158	24.3	8.12	2.74	1070	1670
1480	2840	56.8	355	W 14 × 16 × 193	17.4	6.50	4.05	1060	2040
1470	* 1880	37.6	352	WTM 24 × 9 × 128	37.3	10.1	2.03	1060	1350
1450	3090	61.8	348	W 12 × 12 × 210	12.5	5.89	3.28	1040	2220
1440	*** 1590**	**31.7**	**346**	**W 30 × 10.5 × 108**	**54.7**	**11.9**	**2.15**	**1040**	*** 1140**
1430	* 1680	33.5	343	W 27 × 10 × 114	47.9	11.0	2.18	1030	* 1210
1390	1950	39.1	335	WTM 22 × 8.5 × 133	30.7	9.20	1.89	1000	1410
1390	1940	38.8	333	W 21 × 12.25 × 132	33.6	9.12	2.93	1000	1400
—	—	34.4	327	W 24 × 12.75 × 117	44.1	10.1	2.94	981	* 1240
1340	2100	42.1	322	WTM 18 × 11 × 143	26.7	8.09	2.72	966	1510
1330	2590	51.8	320	W 14 × 16 × 176	18.3	6.43	4.02	960	1860
1320	* 1690	33.9	316	WTM 24 × 9 × 115	40.6	10.0	2.01	947	1220
—	—	**29.1**	**312**	**W 30 × 10.5 × 99**	**57.0**	**11.7**	**2.10**	**937**	*** 1050**
1300	2790	55.8	311	W 12 × 12 × 190	13.6	5.82	3.25	933	2010
1280	1790	35.9	307	W 21 × 12.25 × 122	36.1	9.09	2.92	921	1290
1270	* 1500	30.0	305	W 27 × 10 × 102	52.6	11.0	2.15	916	* 1080
1220	1730	34.5	293	WTM 22 × 8.5 × 118	33.9	9.13	1.86	880	1240
1210	1910	38.2	290	WTM 18 × 11 × 130	28.7	8.03	2.70	871	1380
—	—	30.6	289	W 24 × 12.75 × 104	48.1	10.1	2.91	867	* 1100
1200	2340	46.7	287	W 14 × 16 × 159	20.1	6.38	4.00	861	1680
1170	* 1510	30.3	280	WTM 24 × 9 × 103	44.6	9.96	1.99	840	* 1090
—	—	32.7	279	W 21 × 12.25 × 111	39.1	9.05	2.90	836	1180
1160	*** 1380**	**27.7**	**278**	**W 27 × 10 × 94**	**54.9**	**10.9**	**2.12**	**834**	*** 990**
1140	2500	50.0	275	W 12 × 12 × 170	14.6	5.74	3.22	824	1800
1090	1750	35.1	261	W 18 × 11 × 119	29.0	7.90	2.69	784	1260
—	—	42.7	260	W 14 × 16 × 145	21.7	6.33	3.98	781	1540
1060	* 1380	27.7	254	W 24 × 9 × 94	47.2	9.87	1.98	761	* 990
—	—	29.8	253	W 21 × 12.25 × 101	42.7	9.02	2.89	759	1070
—	—	**24.8**	**244**	**W 27 × 10 × 84**	**58.1**	**10.7**	**2.07**	**733**	*** 890**
1010	2240	44.7	243	W 12 × 12 × 152	15.8	5.66	3.19	728	1610
—	—	38.8	234	W 14 × 14.5 × 132	22.7	6.28	3.76	703	1400
960	1560	31.1	230	W 18 × 11 × 106	31.7	7.84	2.66	691	1120

* Check shape for compliance with Formulas (2.7-1 a) or (2.7-1 b), Sect. 2.7, AISC Specification, as applicabl when subjected to combined axial force and bending moment at ultimate loading.

PLASTIC DESIGN SELECTION TABLE
For W and WTM shapes

Z_x

F_y = 50 ksi		A	Z_x	Shape	$\frac{d}{t_w}$	r_x	r_y	F_y = 36 ksi	
M_p	P_y							M_p	P_y
Kip-ft.	Kip	In.²	In.³			In.	In.	Kip-ft.	Kip.
934	* **1240**	**24.7**	**224**	**W 24 × 9 × 84**	**51.3**	**9.79**	**1.95**	**673**	* **890**
920	* 1370	27.3	221	W 21 × 8.25 × 93	37.3	8.70	1.84	662	984
890	2000	39.9	214	W 12 × 12 × 136	17.0	5.58	3.16	641	1440
—	—	35.3	212	W 14 × 14.5 × 120	24.5	6.24	3.74	636	1270
879	1430	28.5	211	W 18 × 11 × 97	34.7	7.82	2.65	633	1030
835	* **1120**	**22.4**	**200**	**W 24 × 9 × 76**	**54.4**	**9.69**	**1.92**	**601**	* **805**
825	1470	29.4	198	W 16 × 10.25 × 100	29.0	7.10	2.51	594	1060
817	* 1220	24.3	196	W 21 × 8.25 × 83	41.6	8.67	1.83	588	876
—	—	32.0	192	W 14 × 14.5 × 109	27.3	6.22	3.73	575	1150
776	1760	35.3	186	W 12 × 12 × 120	18.5	5.51	3.13	559	1270
—	—	25.3	186	W 18 × 11 × 86	38.3	7.77	2.63	557	911
—	—	**20.1**	**177**	**W 24 × 9 × 68**	**57.2**	**9.55**	**1.87**	**530**	* **722**
727	1310	26.2	175	W 16 × 10.25 × 89	31.9	7.05	2.49	524	941
718	* 1070	21.5	172	W 21 × 8.25 × 73	46.7	8.64	1.81	517	* 773
682	1560	31.2	164	W 12 × 12 × 106	21.1	5.47	3.11	491	1120
—	—	22.3	163	W 18 × 11 × 76	42.8	7.73	2.61	489	* 803
666	* **1000**	**20.0**	**160**	**W 21 × 8.25 × 68**	**49.1**	**8.60**	**1.80**	**480**	* **721**
648	* **921**	**18.4**	**156**	**W 24 × 7 × 62**	**55.2**	**9.25**	**1.37**	**467**	* **663**
625	1130	22.6	150	W 16 × 10.25 × 77	36.3	7.00	2.47	450	814
614	1650	32.9	147	W 10 × 10 × 112	15.0	4.66	2.68	442	1190
614	1410	28.2	147	W 12 × 12 × 96	23.1	5.44	3.09	442	1020
606	* 1040	20.8	145	W 18 × 7.5 × 71	37.3	7.50	1.70	436	750
602	* **913**	**18.3**	**144**	**W 21 × 8.25 × 62**	**52.5**	**8.54**	**1.77**	**433**	* **657**
578	1200	24.1	139	W 14 × 10 × 82	28.1	6.05	2.48	416	866
569	* **820**	**16.4**	**137**	**W 24 × 7 × 55**	**59.7**	**9.14**	**1.33**	**410**	* **591**
555	* 955	19.1	133	W 18 × 7.5 × 65	40.8	7.49	1.69	400	688
—	—	25.6	132	W 12 × 12 × 87	24.3	5.38	3.07	396	921
—	—	19.7	130	W 16 × 10.25 × 67	41.3	6.96	2.46	390	708
541	1470	29.4	130	W 10 × 10 × 100	16.3	4.60	2.65	390	1060
538	* 839	16.8	129	W 21 × 6.5 × 57	52.0	8.36	1.35	387	* 604
523	1090	21.8	126	W 14 × 10 × 74	31.5	6.04	2.48	377	784
511	* 882	17.6	123	W 18 × 7.5 × 60	44.0	7.47	1.69	368	* 635
—	—	23.2	119	W 12 × 12 × 79	26.3	5.34	3.05	357	835
478	999	20.0	115	W 14 × 10 × 68	33.8	6.01	2.46	344	720
470	1290	25.9	113	W 10 × 10 × 88	17.9	4.54	2.63	339	932
466	* **810**	**16.2**	**112**	**W 18 × 7.5 × 55**	**46.4**	**7.41**	**1.67**	**335**	* **583**
461	* **738**	**14.8**	**111**	**W 21 × 6.5 × 50**	**54.8**	**8.19**	**1.30**	**332**	* **531**
438	* 838	16.8	105	W 16 × 7 × 57	38.2	6.72	1.60	316	604
—	—	17.9	102	W 14 × 10 × 61	37.0	5.98	2.45	307	645

* Check shape for compliance with Formulas (2.7-1 a) or (2.7-1 b), Sect. 2.7, AISC Specification, as applicable, when subjected to combined axial force and bending moment at ultimate loading.

Z_x PLASTIC DESIGN SELECTION TABLE

For W and WTM shapes

F_y = 50 ksi		A	Z_x	Shape	$\frac{d}{t_w}$	r_x	r_y	F_y = 36 ksi	
M_p	P_y							M_p	P_y
Kip-ft.	Kip	In.^{2}	In.^{3}			In.	In.	Kip-ft.	Kip.
420	* **733**	**14.7**	**101**	**W 18 × 7.5 × 50**	**50.7**	**7.38**	**1.65**	**302**	* **52**
407	1130	22.6	97.6	W 10 × 10 × 77	20.0	4.49	2.60	293	81
—	**—**	**13.0**	**95.8**	**W 21 × 6.5 × 44**	**59.0**	**8.06**	**1.26**	**287**	* **46**
383	* 737	14.7	92.0	W 16 × 7 × 50	42.8	6.68	1.59	276	53
379	* 678	13.6	90.9	**W 18 × 6 × 46	50.2	7.25	1.29	273	* 48
363	* 781	15.6	87.1	**W 14 × 8 × 53	37.6	5.89	1.92	261	56
—	—	17.0	86.4	W 12 × 10 × 58	33.9	5.28	2.51	259	61
355	999	20.0	85.3	W 10 × 10 × 68	22.1	4.44	2.59	256	71
343	* 663	13.3	82.3	W 16 × 7 × 45	46.8	6.65	1.57	247	* 47
327	* **589**	**11.8**	**78.5**	**W 18 × 6 × 40	**56.8**	**7.22**	**1.27**	**236**	* **42**
327	* 707	14.1	78.4	**W 14 × 8 × 48	40.6	5.85	1.91	235	50
—	—	17.6	74.6	W 10 × 10 × 60	24.3	4.39	2.57	224	63
304	* **589**	**11.8**	**72.9**	**W 16 × 7 × 40**	**52.5**	**6.63**	**1.57**	**219**	* **42**
302	734	14.7	72.4	**W 12 × 8 × 50	32.9	5.18	1.96	217	52
292	984	19.7	70.2	W 8 × 8 × 67	15.8	3.72	2.12	210	70
—	—	12.6	69.6	**W 14 × 8 × 43	44.8	5.82	1.89	209	* 45
—	**—**	**10.3**	**66.7**	**W 18 × 6 × 35**	**59.0**	**7.04**	**1.22**	**200**	* **37**
—	—	15.8	66.6	W 10 × 10 × 54	27.3	4.37	2.56	200	57
270	661	13.2	64.7	**W 12 × 8 × 45	36.0	5.15	1.94	194	47
—	—	10.6	64.0	W 16 × 7 × 36	53.8	6.51	1.52	192	* 38
256	* 558	11.2	61.5	W 14 × 6.75 × 38	45.5	5.87	1.55	184	* 40
249	855	17.1	59.8	W 8 × 8 × 58	17.2	3.65	2.10	179	61
—	—	11.8	57.5	**W 12 × 8 × 40	40.5	5.13	1.94	173	42
229	663	13.3	54.9	W 10 × 8 × 45	28.9	4.32	2.01	165	47
—	**—**	**10.0**	**54.6**	**W 14 × 6.75 × 34**	**49.1**	**5.83**	**1.53**	**164**	* **36**
226	* **457**	**9.1**	**54.2**	**W 16 × 5.5 × 31**	**57.7**	**6.41**	**1.16**	**163**	* **32**
213	* 517	10.3	51.2	W 12 × 6.5 × 35	41.7	5.25	1.54	153	37
204	705	14.1	49.0	W 8 × 8 × 48	21.3	3.61	2.08	147	50
—	—	11.5	46.8	W 10 × 8 × 39	31.5	4.27	1.98	141	41
—	**—**	**7.7**	**44.4**	**W 16 × 5.5 × 26**	**62.8**	**6.27**	**1.12**	**133**	* **27**
—	—	8.7	43.1	W 12 × 6.5 × 30	47.5	5.21	1.52	129	* 31
168	* 386	7.7	40.4	**W 14 × 5 × 26	54.5	5.65	1.07	121	* 27
—	—	11.7	39.8	W 8 × 8 × 40	22.9	3.53	2.04	119	42
152	442	8.8	36.6	W 10 × 5.75 × 30	34.9	4.38	1.37	110	31
—	—	10.3	34.7	W 8 × 8 × 35	26.2	3.51	2.03	104	37

* Check shape for compliance with Formulas (2.7-1 a) or (2.7-1 b), Sect. 2.7, AISC Specification, as applicable, when subjected to combined axial force and bending moment at ultimate loading.

** Presently not available in our rolling program.

PLASTIC DESIGN SELECTION TABLE
For W and WTM shapes

Z_x

F_y = 50 ksi		A	Z_x	Shape	$\frac{d}{t_w}$	r_x	r_y	F_y = 36 ksi	
M_p	P_y							M_p	P_y
Kip-ft.	Kip	In.^{2}	In.^{3}			In.	In.	Kip-ft.	Kip.
—	—	**6.5**	**33.3**	**W 14 × 5 × 22**	**59.7**	**5.54**	**1.04**	**100**	* **235**
130	* 381	7.6	31.3	W 10 × 5.75 × 26	39.7	4.35	1.36	94	274
122	* **324**	**6.4**	**29.3**	**W 12 × 4 × 22**	**47.3**	**4.91**	**0.848**	**88**	* **233**
—	—	8.2	27.2	W 8 × 6.5 × 28	28.3	3.45	1.62	82	297
—	—	6.4	26.0	W 10 × 5.75 × 22	42.4	4.27	1.33	78	233
103	* **279**	**5.5**	**24.7**	**W 12 × 4 × 19**	**51.7**	**4.82**	**0.822**	**74**	* **201**
—	—	7.0	23.2	W 8 × 6.5 × 24	32.4	3.42	1.61	69	255
90	* 281	5.6	21.6	W 10 × 4 × 19	41.0	4.14	0.874	65	202
85	308	6.1	20.4	W 8 × 5.25 × 21	33.1	3.49	1.26	61	222
—	—	**4.7**	**20.1**	**W 12 × 4 × 16**	**54.5**	**4.67**	**0.773**	**60**	* **170**
79	367	7.3	18.9	W 6 × 6 × 25	19.9	2.70	1.52	57	264
78	* 250	4.9	18.7	W 10 × 4 × 17	42.1	4.05	0.845	56	180
—	—	5.2	17.0	W 8 × 5.25 × 18	35.4	3.43	1.23	51	189
—	—	**4.4**	**16.0**	**W 10 × 4 × 15**	**43.4**	**3.95**	**0.810**	**48**	* **159**
—	—	5.8	14.9	W 6 × 6 × 20	23.8	2.66	1.50	45	211
57	222	4.4	13.6	W 8 × 4 × 15	33.1	3.29	0.876	41	160
49	237	4.7	11.7	W 6 × 4 × 16	24.2	2.60	0.967	35	171
48	278	5.5	11.6	W 5 × 5 × 19	19.1	2.17	1.28	35	200
—	—	**3.8**	**11.4**	**W 8 × 4 × 13**	**34.7**	**3.21**	**0.843**	**34**	**138**
40	235	4.7	9.6	W 5 × 5 × 16	20.9	2.13	1.26	29	169
—	—	3.5	8.3	W 6 × 4 × 12	26.2	2.49	0.918	25	128
33	239	4.7	7.8	M 4 × 4 × 16.3	13.5	1.71	1.00	24	172
26	202	4.0	6.3	M 4 × 4 × 13.8	12.8	1.64	0.991	19	145
25	190	3.8	6.0	M 4 × 4 × 13	15.7	1.66	0.998	18	137

* Check shape for compliance with Formulas (2.7-1 a) or (2.7-1 b), Sect. 2.7, AISC Specification, as applicable, when subjected to combined axial force and bending moment at ultimate loading.

** Presently not available in our rolling program.

I_x MOMENT OF INERTIA SELECTION TABLE

For W and WTM shapes

Shape	I_x In.⁴
WTM 36 × 16.5 × 848	**67400**
WTM 36 × 16.5 × 798	**62600**
WTM 40 × 16 × 655	**56500**
WTM 36 × 16.5 × 720	55300
WTM 40 × 16 × 593	**50400**
WTM 36 × 16.5 × 650	48900
WTM 40 × 12 × 561	**45300**
WTM 40 × 16 × 531	**44300**
WTM 36 × 16.5 × 588	43500
WTM 33 × 15.75 × 619	41800
WTM 40 × 12 × 520	**41500**
WTM 36 × 12 × 548	39600
WTM 40 × 16 × 480	**39500**
WTM 36 × 16.5 × 527	38300
WTM 33 × 15.75 × 567	37700
WTM 40 × 12 × 475	**37300**
WTM 36 × 12 × 508	36300
WTM 40 × 16 × 436	**35400**
WTM 36 × 16.5 × 485	34700
WTM 40 × 12 × 437	33900
WTM 33 × 15.75 × 515	33700
WTM 30 × 15 × 581	33000
WTM 33 × 11.5 × 520	32900
WTM 36 × 12 × 464	32600
WTM 40 × 16 × 397	**32000**
WTM 36 × 16.5 × 439	31000
WTM 40 × 12 × 396	30400
WTM 33 × 15.75 × 468	30100
WTM 33 × 11.5 × 476	29700
WTM 36 × 12 × 426	29500
WTM 30 × 15 × 526	29300
WTM 40 × 16 × 362	**28900**
WTM 32 × 12 × 511	28500
WTM 36 × 16.5 × 393	27500
WTM 40 × 12 × 359	**27200**
WTM 33 × 15.75 × 424	26900
W 40 × 18 × 328	**26800**
WTM 33 × 11.5 × 432	26500
WTM 36 × 12 × 387	26500
WTM 30 × 15 × 477	26100
WTM 40 × 16 × 324	**25600**
WTM 27 × 14 × 539	25500
WTM 32 × 12 × 462	25300
WTM 30 × 10.5 × 475	25100
WTM 36 × 16.5 × 359	24800
WTM 40 × 12 × 327	24500
WTM 33 × 15.75 × 387	24300
W 40 × 18 × 298	**24200**
WTM 33 × 11.5 × 398	24000
WTM 36 × 12 × 350	23600
WTM 40 × 16 × 297	**23200**
WTM 30 × 15 × 433	23200
WTM 27 × 14 × 494	22900
WTM 30 × 10.5 × 435	22500
WTM 32 × 12 × 418	22500
WTM 36 × 16.5 × 328	22500
WTM 40 × 12 × 294	**21900**
W 40 × 16 × 277	**21900**
WTM 33 × 15.75 × 354	21900
WTM 28 × 12 × 485	21600
W 40 × 18 × 268	**21500**
WTM 33 × 11.5 × 361	21400
WTM 36 × 12 × 318	21300
WTM 30 × 15 × 391	20700
WTM 27 × 14 × 448	20400
W 36 × 16.5 × 300	20300
WTM 30 × 10.5 × 394	20100
WTM 32 × 12 × 380	20000
WTM 27 × 10 × 446	19700
WTM 33 × 15.75 × 318	19500
W 40 × 16 × 249	**19500**
WTM 33 × 11.5 × 332	19500
WTM 40 × 12 × 264	19400
W 40 × 18 × 244	**19200**
WTM 24 × 12.75 × 492	19100
WTM 28 × 12 × 438	19100
W 36 × 16.5 × 280	18900
WTM 36 × 12 × 286	18900
WTM 26 × 12 × 473	18700
WTM 30 × 15 × 357	18600
WTM 27 × 14 × 407	18100
WTM 30 × 10.5 × 358	17800
WTM 32 × 12 × 343	17800
WTM 33 × 15.75 × 291	17700
WTM 27 × 10 × 407	17700
WTM 33 × 11.5 × 302	17500
W 40 × 12 × 235	**17400**
W 36 × 16.5 × 260	17300
WTM 24 × 12.75 × 450	17100
WTM 28 × 12 × 397	17000
WTM 30 × 12 × 326	16800
WTM 36 × 12 × 256	16800
W 40 × 16 × 215	**16700**
W 40 × 18 × 221	16600
WTM 26 × 12 × 427	16500
WTM 32 × 12 × 313	16100
WTM 27 × 14 × 368	16100
W 36 × 16.5 × 245	16100
WTM 30 × 10.5 × 323	15900
WTM 24 × 12 × 457	15900
WTM 33 × 15.75 × 263	15800
WTM 27 × 10 × 369	15700
WTM 33 × 11.5 × 271	15600
W 40 × 12 × 211	**15500**
WTM 24 × 12.75 × 408	15100
WTM 28 × 12 × 360	15000
W 36 × 16.5 × 230	15000
WTM 36 × 12 × 232	15000
W 40 × 16 × 199	**14900**
WTM 30 × 15 × 292	14900
WTM 26 × 12 × 387	14700
WTM 27 × 14 × 336	14500
WTM 32 × 12 × 286	14500
W 14 × 16 × 730	14300
WTM 30 × 10.5 × 295	14300
W 33 × 15.75 × 241	14200
WTM 24 × 12 × 414	14000
WTM 27 × 10 × 335	13900
WTM 33 × 11.5 × 243	13800
W 40 × 18 × 192	**13500**
WTM 24 × 12.75 × 370	13400
WTM 28 × 12 × 325	13400
W 40 × 12 × 183	**13300**
W 36 × 12 × 210	13200
WTM 27 × 14 × 307	13100
WTM 30 × 15 × 261	13100
WTM 30 × 10.5 × 269	12900
WTM 26 × 12 × 351	12900
W 33 × 15.75 × 221	12800
WTM 32 × 12 × 256	12800
WTM 24 × 12 × 375	12400
WTM 24 × 9 × 354	12400
W 14 × 16 × 665	12400
WTM 27 × 10 × 302	12400
WTM 33 × 11.5 × 219	12300
WTM 21 × 12.25 × 402	12200
W 40 × 16 × 174	**12100**
W 36 × 12 × 194	12100
WTM 28 × 12 × 296	12000
WTM 27 × 14 × 281	11900
WTM 24 × 12.75 × 335	11900
WTM 30 × 15 × 235	11700
WTM 30 × 10.5 × 246	11700

MOMENT OF INERTIA SELECTION TABLE

For W and WTM shapes

I_x

Shape	I_x In.⁴
W 40 × 12 × 167	**11600**
WTM 32 × 12 × 234	11600
WTM 22 × 12 × 395	11500
WTM 26 × 12 × 317	11500
W 33 × 15.75 × 201	11500
WTM 33 × 11.5 × 204	11400
W 36 × 12 × 182	11300
WTM 24 × 12 × 343	11100
WTM 24 × 9 × 319	10900
WTM 27 × 10 × 271	10900
WTM 27 × 14 × 258	10800
WTM 21 × 12.25 × 364	10800
W 14 × 16 × 605	10800
WTM 28 × 12 × 270	10800
WTM 24 × 12.75 × 306	10700
WTM 30 × 10.5 × 226	10600
W 36 × 12 × 170	10500
WTM 33 × 11.5 × 187	10300
WTM 26 × 12 × 289	10300
W 30 × 15 × 211	10300
WTM 22 × 12 × 357	10100
WTM 24 × 12 × 310	9850
WTM 28 × 12 × 247	9800
WTM 27 × 10 × 247	9780
W 40 × 12 × 149	**9780**
WTM 24 × 9 × 291	9760
W 36 × 12 × 160	9750
WTM 27 × 14 × 235	9660
WTM 21 × 12.25 × 333	9610
WTM 24 × 12.75 × 279	9600
WTM 30 × 10.5 × 207	9540
W 14 × 16 × 550	9430
WTM 33 × 11.5 × 169	9290
WTM 26 × 12 × 264	9270
W 30 × 15 × 191	9170
WTM 22 × 12 × 326	9050
W 36 × 12 × 150	9040
WTM 27 × 14 × 217	8870
WTM 28 × 12 × 226	8850
WTM 24 × 12 × 280	8680
WTM 24 × 9 × 264	8650
WTM 27 × 10 × 221	8630
WTM 24 × 12.75 × 250	8490
WTM 30 × 10.5 × 185	8480
WTM 21 × 12.25 × 300	8480
WTM 26 × 12 × 241	8400
W 14 × 16 × 500	8210
W 30 × 15 × 173	8200
W 33 × 11.5 × 152	8160
WTM 22 × 12 × 295	8010
WTM 27 × 14 × 194	7820

Shape	I_x In.⁴
W 36 × 12 × 135	**7800**
WTM 27 × 10 × 201	7780
WTM 24 × 12 × 253	7750
WTM 24 × 9 × 239	7740
WTM 24 × 12.75 × 229	7650
WTM 21 × 12.25 × 275	7620
WTM 26 × 12 × 221	7580
WTM 30 × 10.5 × 165	7470
W 33 × 11.5 × 141	7450
W 14 × 16 × 455	7190
WTM 22 × 12 × 269	7170
W 27 × 14 × 178	6990
WTM 18 × 11 × 311	6960
WTM 27 × 10 × 182	6950
WTM 24 × 9 × 218	6920
WTM 24 × 12 × 228	6850
WTM 24 × 12.75 × 207	6820
WTM 21 × 12.25 × 248	6760
W 33 × 11.5 × 130	**6710**
WTM 30 × 10.5 × 148	6680
W 14 × 16 × 426	6600
WTM 22 × 8.5 × 236	6420
WTM 22 × 12 × 245	6410
W 27 × 14 × 161	6280
WTM 24 × 12.75 × 192	6260
WTM 24 × 9 × 198	6230
WTM 18 × 11 × 283	6160
WTM 24 × 12 × 207	6140
W 14 × 16 × 398	6000
WTM 21 × 12.25 × 223	5950
WTM 27 × 10 × 159	5950
W 33 × 11.5 × 118	**5900**
WTM 22 × 12 × 223	5780
W 30 × 10.5 × 132	5770
WTM 22 × 8.5 × 216	5760
WTM 24 × 12.75 × 176	5680
W 27 × 14 × 146	5630
WTM 24 × 9 × 181	5600
WTM 18 × 11 × 258	5510
WTM 24 × 12 × 188	5500
W 14 × 16 × 370	5440
W 30 × 10.5 × 124	5360
WTM 27 × 10 × 143	5330
WTM 21 × 12.25 × 201	5310
WTM 22 × 12 × 204	5190
W 24 × 12.75 × 162	5170
WTM 22 × 8.5 × 194	5090
WTM 24 × 9 × 163	5000

Shape	I_x In.⁴
W 30 × 10.5 × 116	**4930**
WTM 18 × 11 × 234	4900
W 14 × 16 × 342	4900
WTM 27 × 10 × 129	4760
WTM 21 × 12.25 × 182	4730
WTM 22 × 8.5 × 178	4600
W 24 × 12.75 × 146	4580
W 30 × 10.5 × 108	**4470**
WTM 24 × 9 × 146	4410
W 14 × 16 × 311	4330
WTM 18 × 11 × 211	4330
WTM 21 × 12.25 × 166	4280
WTM 22 × 8.5 × 161	4100
W 27 × 10 × 114	4090
W 12 × 12 × 336	4060
W 24 × 12.75 × 131	4020
W 30 × 10.5 × 99	**3990**
WTM 18 × 11 × 192	3870
W 14 × 16 × 283	3840
WTM 24 × 9 × 128	3810
WTM 22 × 8.5 × 146	3660
W 21 × 12.25 × 147	3630
W 27 × 10 × 102	3620
W 12 × 12 × 305	3550
W 24 × 12.75 × 117	3540
WTM 18 × 11 × 175	3450
W 14 × 16 × 257	3400
WTM 24 × 9 × 115	3400
WTM 22 × 8.5 × 133	3310
W 27 × 10 × 94	**3270**
W 21 × 12.25 × 132	3220
W 12 × 12 × 279	3110
W 24 × 12.75 × 104	3100
WTM 18 × 11 × 158	3060
W 14 × 16 × 233	3010
WTM 24 × 9 × 103	3000
W 21 × 12.25 × 122	2960
WTM 22 × 8.5 × 118	2870
W 27 × 10 × 84	**2850**
WTM 18 × 11 × 143	2750
W 12 × 12 × 252	2720
W 24 × 9 × 94	2700
W 21 × 12.25 × 111	2670
W 14 × 16 × 211	2660
WTM 18 × 11 × 130	2460
W 12 × 12 × 230	2420
W 21 × 12.25 × 101	2420
W 14 × 16 × 193	2400

I_x

MOMENT OF INERTIA SELECTION TABLE
For W and WTM shapes

Shape	I_x in.⁴
W 24 × 9 × 84	**2370**
W 18 × 11 × 119	2190
W 14 × 16 × 176	2140
W 12 × 12 × 210	2140
W 24 × 9 × 76	**2100**
W 21 × 8.25 × 93	2070
W 18 × 11 × 106	1910
W 14 × 16 × 159	1900
W 12 × 12 × 190	1890
W 21 × 8.25 × 83	1830
W 24 × 9 × 68	**1830**
W 18 × 11 × 97	1750
W 14 × 16 × 145	1710
W 12 × 12 × 170	1650
W 21 × 8.25 × 73	1600
W 24 × 7 × 62	**1580**
W 18 × 11 × 86	1530
W 14 × 14.5 × 132	1530
W 16 × 10.25 × 100	1490
W 21 × 8.25 × 68	1480
W 12 × 12 × 152	1430
W 14 × 14.5 × 120	1380
W 24 × 7 × 55	**1370**
W 18 × 11 × 76	1330
W 21 × 8.25 × 62	1330
W 16 × 10.25 × 89	1300
W 14 × 14.5 × 109	1240
W 12 × 12 × 136	1240
W 18 × 7.5 × 71	1170
W 21 × 6.5 × 57	1170
W 14 × 14.5 × 99	1110
W 16 × 10.25 × 77	1110
W 12 × 12 × 120	1070
W 18 × 7.5 × 65	1070
W 14 × 14.5 × 90	999
W 21 × 6.5 × 50	**989**
W 18 × 7.5 × 60	984
W 16 × 10.25 × 67	954
W 12 × 12 × 106	933
W 18 × 7.5 × 55	890
W 14 × 10 × 82	882

Shape	I_x in.⁴
W 21 × 6.5 × 44	**847**
W 12 × 12 × 96	833
W 18 × 7.5 × 50	800
W 14 × 10 × 74	796
W 16 × 7 × 57	758
W 12 × 12 × 87	740
W 14 × 10 × 68	723
W 10 × 10 × 112	716
*W 18 × 6 × 46	713
W 12 × 12 × 79	662
W 16 × 7 × 50	659
W 14 × 10 × 61	640
W 10 × 10 × 100	623
***W 18 × 6 × 40**	**613**
W 12 × 12 × 72	597
W 16 × 7 × 45	586
*W 14 × 8 × 53	541
W 10 × 10 × 88	534
W 12 × 12 × 65	533
W 16 × 7 × 40	**518**
***W 18 × 6 × 35**	**511**
*W 14 × 8 × 48	485
W 12 × 10 × 58	475
W 10 × 10 × 77	455
W 16 × 7 × 36	448
*W 14 × 8 × 43	428
W 12 × 10 × 53	425
*W 12 × 8 × 50	394
W 10 × 10 × 68	394
W 14 × 6.75 × 38	385
***W 16 × 5.5 × 31**	**376**
*W 12 × 8 × 45	350
W 10 × 10 × 60	341
W 14 × 6.75 × 34	340
*W 12 × 8 × 40	310
W 10 × 10 × 54	303
***W 16 × 5.5 × 26**	**302**
W 14 × 6.75 × 30	291
W 12 × 6.5 × 35	285
W 10 × 10 × 49	272
W 8 × 8 × 67	272
W 10 × 8 × 45	248
*W 14 × 5 × 26	246
W 12 × 6.5 × 30	238
W 8 × 8 × 58	228
W 10 × 8 × 39	209
W 12 × 6.5 × 26	**204**

Shape	I_x in.⁴
***W 14 × 5 × 22**	**200**
W 8 × 8 × 48	184
W 10 × 8 × 33	171
W 10 × 5.75 × 30	170
***W 12 × 4 × 22**	**156**
W 8 × 8 × 40	146
W 10 × 5.75 × 26	144
***W 12 × 4 × 19**	**130**
W 8 × 8 × 35	127
W 10 × 5.75 × 22	118
W 8 × 8 × 31	110
***W 12 × 4 × 16**	**103**
W 8 × 6.5 × 28	98.0
*W 10 × 4 × 19	96.3
***W 12 × 4 × 14**	**88.6**
W 8 × 6.5 × 24	82.8
*W 10 × 4 × 17	81.9
W 8 × 5.25 × 21	75.3
*W 10 × 4 × 15	68.9
W 8 × 5.25 × 18	61.9
***W 10 × 4 × 12**	**53.8**
W 6 × 6 × 25	53.4
*W 8 × 4 × 15	48.0
W 6 × 6 × 20	41.4
*W 8 × 4 × 13	39.6
*W 6 × 4 × 16	32.1
***W 8 × 4 × 10**	**30.8**
W 6 × 6 × 15	29.1
W 5 × 5 × 19	26.3
*W 6 × 4 × 12	22.1
W 5 × 5 × 16	21.4
***W 6 × 4 × 9**	**16.4**
M 4 × 4 × 16.3	14.0
M 4 × 4 × 13.8	10.8
M 4 × 4 × 13	10.5

* Presently not available in our rolling program

40″ Wide flange and tailor-made beams
Uniform load constants
for beams laterally supported

Shape	W_c	V	L_v	L_c	L_u	R	R_i	N_e	S	D_c
	Kip-ft.	Kip	Ft.	Ft.	Ft.	Kip	Kip	In.	In.^{3}	In./Ft.^{2}
W 40 × 18 × 328	21400	524	20.4	18.9	35.9	163	24.6	18.2	1340	0.62
298	19500	474	20.6	18.8	32.8	146	22.4	18.2	1220	0.63
268	17400	425	20.5	18.7	29.5	128	20.3	18.2	1090	0.63
244	15700	399	19.7	18.7	26.4	117	19.2	18.2	983	0.64
221	13700	395	17.3	18.7	22.6	114	19.2	18.2	858	0.64
192	11300	391	14.5	17.8	19.7	110	19.2	18.1	708	0.65
W 40 × 16 × 277	17600	474	18.6	16.7	29.1	146	22.4	18.2	1100	0.63
249	15900	425	18.7	16.6	26.3	128	20.3	18.2	992	0.63
215	13700	365	18.8	16.6	22.8	107	17.5	18.2	858	0.64
199	12300	362	17.0	16.6	20.1	104	17.5	18.2	769	0.64
174	10200	358	14.3	15.8	17.4	101	17.5	18.1	636	0.65
W 40 × 12 × 235	14000	474	14.8	12.6	21.8	146	22.4	18.2	874	0.63
211	12600	425	14.8	12.5	19.7	128	20.3	18.2	785	0.63
183	10900	365	14.9	12.5	17.1	107	17.5	18.2	682	0.64
167	9580	361	13.3	12.5	14.5	104	17.5	18.1	599	0.64
149	8190	347	11.8	11.9	12.6	97.8	17.0	18.1	512	0.65

Notes:

Where L is the span in feet:

Total allowable uniform load in kips = W_c/L.

End reaction in kips = $W_c/2L$.

Midspan deflection in inches = $D_c \times L^2/1000$.

For unbraced lengths greater than L_c and less than L_u, multiply the constants W_c and D_c by the ratio $22/F_b$, where F_b = 24 ksi.

I

BEAMS

F_y = 36 ksi

40″ Wide flange and tailor-made beams
Uniform load constants
for beams laterally supported

Shape	W_c	V	L_v	L_c	L_u	R	R_i	N_e	S	D_c
	Kip-ft.	Kip	Ft.	Ft.	Ft.	Kip	Kip	In.	In.³	In./F
WTM 40 × 16 ×655	41400	1237	16.7	17.8	63.4	449	53.2	18.3	2590	0.5
593	37400	1108	16.9	17.6	58.1	393	48.3	18.3	2340	0.5
531	33400	982	17.0	17.4	52.5	340	43.5	18.3	2090	0.5
480	30200	879	17.2	17.3	47.8	296	39.4	18.3	1890	0.5
436	27400	798	17.2	17.1	43.6	265	36.2	18.2	1710	0.6
397	25000	719	17.4	17.0	40.1	235	32.9	18.2	1560	0.6
362	22700	654	17.4	16.9	36.8	208	30.2	18.3	1420	0.6
324	20500	578	17.7	16.8	33.2	181	27.0	18.2	1280	0.6
297	18700	534	17.5	16.7	30.3	165	25.1	18.2	1170	0.6
WTM 40 × 12 ×561	33300	1237	13.5	13.6	48.6	449	53.2	18.3	2080	0.5
520	30700	1137	13.5	13.5	45.5	405	49.4	18.3	1920	0.5
475	28000	1037	13.5	13.4	41.7	362	45.6	18.3	1750	0.5
437	25800	946	13.6	13.2	38.5	324	42.1	18.3	1610	0.5
396	23400	852	13.7	13.1	35.2	288	38.3	18.2	1460	0.6
359	21100	771	13.7	12.9	32.0	252	35.1	18.3	1320	0.6
327	19200	693	13.9	12.8	29.4	223	31.9	18.3	1200	0.6
294	17300	617	14.0	12.7	26.6	195	28.6	18.2	1080	0.6
264	15500	553	14.0	12.6	23.9	172	25.9	18.2	971	0.6
WTM 36 × 16.5 × 848	50700	1540	16.5	19.1	89.6	625	68.0	17.0	3170	0.5
798	47700	1438	16.6	19.0	85.1	574	64.3	16.9	2980	0.5
720	43000	1284	16.7	18.8	77.9	501	58.5	16.9	2690	0.6
650	38700	1148	16.9	18.6	71.2	435	53.2	16.9	2420	0.6
588	34900	1027	17.0	18.4	65.3	381	48.3	16.9	2180	0.6
527	31200	909	17.2	18.2	59.2	329	43.5	16.8	1950	0.6
485	28600	837	17.1	18.1	54.8	296	40.5	16.8	1790	0.6
439	25900	749	17.3	17.9	50.1	259	36.7	16.8	1620	0.6
393	23200	664	17.5	17.8	45.3	224	32.9	16.8	1450	0.6
359	21100	603	17.5	17.7	41.6	200	30.2	16.8	1320	0.6
328	19400	545	17.8	17.6	38.4	179	27.5	16.8	1210	0.6
WTM 36 × 12 ×548	30900	1165	13.3	14.0	52.8	422	53.2	17.5	1930	0.6
508	28600	1069	13.4	13.8	49.4	383	49.4	17.4	1790	0.6
464	26100	974	13.4	13.7	45.3	342	45.6	17.3	1630	0.6
426	23800	889	13.4	13.5	42.0	303	42.1	17.4	1490	0.6
387	21600	799	13.5	13.4	38.4	268	38.3	17.3	1350	0.6
350	19500	723	13.5	13.2	34.9	237	35.1	17.3	1220	0.6
318	17800	649	13.7	13.1	32.1	209	31.9	17.3	1110	0.6
286	16000	577	13.9	13.0	29.1	182	28.6	17.3	1000	0.6
256	14300	517	13.8	12.9	26.1	159	25.9	17.3	895	0.6
232	12900	465	13.9	12.8	23.7	141	23.5	17.3	809	0.6

Notes:

Where L is the span in feet:

Total allowable uniform load in kips = W_c/L.

End reaction in kips = $W_c/2L$.

Midspan deflection in inches = $D_c \times L^3/1000$.

For unbraced lengths greater than L_c and less than L_u, multiply the constants W_c and D_c by the ratio $22/f_b$ where f_b = 24 ksi.

BEAMS

40″ Wide flange and tailor-made beams
Uniform load constants
for beams laterally supported

I

Shape	W_c	V	L_v	L_c	L_u	R	R_i	N_e	S	D_c
	Kip-ft.	Kip	Ft.	Ft.	Ft.	Kip	Kip	In.	In.^{3}	In./Ft.^{2}
WTM 33 × 15.75 × 619	34700	1091	15.9	17.8	72.0	419	53.2	16.1	2170	0.65
567	31800	988	16.1	17.7	66.9	370	48.9	16.2	1990	0.65
515	29000	888	16.3	17.5	61.5	326	44.5	16.1	1810	0.66
468	26100	806	16.2	17.4	56.3	287	41.0	16.1	1630	0.67
424	23700	722	16.4	17.2	51.5	254	37.3	16.1	1480	0.68
387	21600	652	16.6	17.1	47.6	225	34.0	16.0	1350	0.69
354	19700	594	16.6	17.0	43.8	200	31.3	16.1	1230	0.70
318	17800	527	16.9	16.9	39.8	174	28.1	16.1	1110	0.71
291	16200	482	16.8	16.8	36.6	157	25.9	16.0	1010	0.71
263	14700	433	17.0	16.7	33.3	138	23.5	16.0	917	0.72
WTM 33 × 11.5 × 520	27400	1091	12.6	13.5	54.5	419	53.2	16.1	1710	0.65
476	25000	988	12.6	13.3	50.5	370	48.9	16.2	1560	0.65
432	22700	888	12.8	13.2	46.2	326	44.5	16.1	1420	0.66
398	20800	818	12.7	13.1	42.8	294	41.6	16.1	1300	0.67
361	18900	734	12.9	12.9	39.2	258	37.8	16.1	1180	0.68
332	17300	674	12.8	12.8	36.2	233	35.1	16.1	1080	0.69
302	15700	605	13.0	12.7	33.3	207	31.9	16.0	983	0.70
271	14100	538	13.1	12.6	30.2	179	28.6	16.0	884	0.70
243	12700	482	13.2	12.5	27.1	157	25.9	16.0	791	0.71
219	11400	433	13.2	12.3	24.6	138	23.5	16.0	714	0.72
204	10600	400	13.2	12.3	22.9	126	21.9	16.0	662	0.72
187	9720	368	13.2	12.2	21.1	114	20.3	16.0	607	0.73
169	8790	326	13.5	12.1	19.2	101	18.1	16.0	549	0.73
WTM 32 × 12 × 511	25300	1021	12.4	13.7	59.2	445	53.2	14.3	1580	0.69
462	22900	911	12.6	13.5	54.2	390	48.3	14.3	1430	0.70
418	20600	817	12.6	13.4	49.7	341	44.0	14.3	1290	0.71
380	18700	740	12.6	13.2	45.4	304	40.5	14.3	1170	0.72
343	17000	662	12.8	13.1	41.4	266	36.7	14.3	1060	0.73
313	15400	596	12.9	12.9	38.1	236	33.5	14.2	963	0.74
286	14100	542	13.0	12.8	35.0	212	30.8	14.2	878	0.75
256	12600	479	13.2	12.7	31.6	184	27.5	14.2	788	0.76
234	11500	437	13.2	12.6	29.0	165	25.4	14.2	719	0.77

Notes:

Where L is the span in feet:

Total allowable uniform load in kips = W_c / L.
End reaction in kips = $W_c / 2L$.
Midspan deflection in inches = $D_c \times L^2 / 1000$.

For unbraced lengths greater than L_c and less than L_u, multiply the constants W_c and D_c by the ratio $22/F_b$, where F_b = 24 ksi.

I

BEAMS

F_y = 36 ksi

40" Wide flange and tailor-made beams
Uniform load constants
for beams laterally supported

Shape	W_c	V	L_c	L_c	L_u	R	R_1	N_s	S	D_c
	Kip-ft.	Kip	Ft.	Ft.	Ft.	Kip	Kip	In.	In.^{3}	In./F
WTM 30 × 15 × 581	29900	1004	14.9	17.1	75.0	416	53.2	14.6	1870	0.7(
526	26900	896	15.0	16.9	68.9	362	48.3	14.5	1680	0.7
477	24500	803	15.3	16.7	63.3	319	44.0	14.5	1530	0.7
433	22100	727	15.2	16.6	58.0	281	40.5	14.5	1380	0.7
391	20000	650	15.4	16.5	53.1	248	36.7	14.5	1250	0.7
357	18200	586	15.5	16.3	48.9	218	33.5	14.5	1140	0.7(
326	16500	532	15.5	16.2	45.0	194	30.8	14.5	1030	0.7
292	14900	470	15.8	16.1	40.8	169	27.5	14.4	928	0.7(
261	13200	423	15.6	16.0	36.6	149	25.1	14.4	827	0.7(
235	11900	374	15.9	15.9	33.4	129	22.4	14.4	746	0.7(
WTM 30 × 10.5 × 475	22700	1004	11.3	12.5	54.6	416	53.2	14.6	1420	0.7(
435	20600	908	11.3	12.3	50.6	370	48.9	14.5	1290	0.7
394	18700	815	11.5	12.1	46.4	323	44.5	14.5	1170	0.7
358	17000	739	11.5	12.0	42.3	287	41.0	14.5	1060	0.7
323	15300	661	11.6	11.8	38.7	252	37.3	14.5	955	0.7(
295	13900	597	11.6	11.7	35.6	223	34.0	14.5	871	0.7(
269	12700	543	11.7	11.6	32.7	200	31.3	14.4	793	0.7(
246	11600	491	11.8	11.5	30.2	177	28.6	14.5	727	0.7
226	10600	449	11.8	11.4	27.8	160	26.5	14.4	665	0.7
207	9680	413	11.7	11.3	25.4	144	24.6	14.4	605	0.7
185	8690	364	11.9	11.2	23.0	126	21.9	14.4	543	0.8
165	7730	325	11.9	11.1	20.6	110	19.7	14.4	483	0.8
148	6970	287	12.1	11.1	18.7	96.5	17.5	14.4	436	0.8
WTM 28 × 12 × 485	21600	911	11.8	13.7	66.4	435	53.2	12.4	1350	0.7
438	19400	812	11.9	13.5	60.9	381	48.3	12.4	1210	0.7
397	17600	726	12.1	13.4	55.9	336	44.0	12.4	1100	0.8
360	15800	656	12.0	13.2	51.2	296	40.5	12.4	990	0.8
325	14300	586	12.2	13.1	46.8	259	36.7	12.4	894	0.8
296	13000	527	12.3	13.0	43.1	230	33.5	12.4	815	0.8
270	11900	478	12.4	12.9	39.7	206	30.8	12.3	742	0.8
247	10900	432	12.6	12.8	36.7	184	28.1	12.3	680	0.8
226	9940	394	12.6	12.7	33.7	165	25.9	12.3	621	0.8

Notes:

Where L is the span in feet:

Total allowable uniform load in kips = W_c / L

End reaction in kips = $W_c / 2 L$

Midspan deflection in inches = $D_c \times L^2 / 1000$

For unbraced lengths greater than L_c and less than L_u, multiply the constants W_c and D_c by the ratio 22/F_y where F_y = 24 ksi.

F_y = 36 ksi

BEAMS

40″ Wide flange and tailor-made beams
Uniform load constants
for beams laterally supported

I

Shape	W_c	V	L_v	L_c	L_u	R	R_i	N_e	S	D_c
	Kip-ft.	Kip	Ft.	Ft.	Ft.	Kip	Kip	In.	In.^{3}	In./Ft.^{2}
WTM 27 × 14 × 539	25100	923	13.6	16.1	76.9	412	53.2	13.1	1570	0.76
494	23000	833	13.8	15.9	71.5	367	48.9	13.1	1440	0.78
448	20800	747	13.9	15.8	65.8	320	44.5	13.1	1300	0.79
407	18700	676	13.8	15.6	60.4	285	41.0	13.0	1170	0.80
368	17000	604	14.1	15.5	55.4	249	37.3	13.0	1060	0.82
336	15500	544	14.2	15.4	51.2	221	34.0	13.0	970	0.83
307	14100	495	14.3	15.2	47.2	198	31.3	13.0	884	0.84
281	13000	447	14.5	15.1	43.8	175	28.6	13.0	811	0.85
258	11900	409	14.5	15.1	40.4	159	26.5	13.0	742	0.86
235	10800	376	14.4	15.0	36.9	143	24.6	13.0	674	0.87
217	9980	340	14.7	14.9	34.5	127	22.4	13.0	624	0.87
194	8900	304	14.7	14.8	31.0	113	20.3	12.9	556	0.88
WTM 27 × 10 × 446	19400	923	10.5	12.0	57.3	412	53.2	13.1	1210	0.76
407	17800	833	10.7	11.8	53.1	367	48.9	13.1	1110	0.78
369	16000	746	10.7	11.7	48.7	320	44.5	13.1	1000	0.79
335	14400	675	10.7	11.5	44.5	285	41.0	13.0	902	0.80
302	13000	604	10.8	11.4	40.7	249	37.3	13.0	815	0.82
271	11700	534	10.9	11.2	36.9	218	33.5	13.0	729	0.83
247	10600	485	10.9	11.1	33.9	192	30.8	13.0	662	0.84
221	9480	428	11.1	11.0	30.7	167	27.5	13.0	593	0.85
201	8640	390	11.1	10.9	28.1	151	25.4	12.9	540	0.86
182	7810	349	11.2	10.8	25.6	132	22.9	12.9	488	0.87
159	6780	304	11.2	10.7	22.4	113	20.3	12.9	424	0.88
143	6120	269	11.4	10.6	20.4	98.4	18.1	12.9	383	0.89
129	5510	243	11.4	10.6	18.4	87.5	16.5	12.9	345	0.90
WTM 26 × 12 × 473	19800	858	11.5	13.8	70.7	435	53.2	11.4	1240	0.82
427	17900	763	11.7	13.6	65.0	381	48.3	11.4	1120	0.84
387	16200	682	11.9	13.4	59.8	333	44.0	11.4	1010	0.85
351	14500	616	11.8	13.3	54.7	296	40.5	11.4	909	0.87
317	13100	549	11.9	13.1	50.1	259	36.7	11.4	821	0.89
289	12000	494	12.2	13.0	46.2	230	33.5	11.4	748	0.90
264	10900	447	12.2	12.9	42.6	206	30.8	11.3	680	0.91
241	9980	403	12.4	12.8	39.4	183	28.1	11.4	624	0.92
221	9110	368	12.4	12.7	36.3	165	25.9	11.3	569	0.93

Notes:

Where L is the span in feet:

Total allowable uniform load in kips = W_c / L.

End reaction in kips = $W_c / 2L$.

Midspan deflection in inches = $D_c \times L^2 / 1000$.

For unbraced lengths greater than L_c and less than L_u, multiply the constants W_c and D_c by the ratio $22/F_b$, where F_b = 24 ksi.

I

BEAMS

F_y = 36 ksi

40″ Wide flange and tailor-made beams
Uniform load constants
for beams laterally supported

Shape	W_c	V	L_v	L_c	L_u	R	R_i	N_e	S	D_c
	Kip-ft.	Kip	Ft.	Ft.	Ft.	Kip	Kip	In.	In.^{3}	In./Ft
WTM 24 x 12.75 x 492	20600	841	12.2	14.9	78.0	416	53.2	11.5	1290	0.84
450	18700	758	12.3	14.7	72.6	370	48.9	11.5	1170	0.85
408	17000	678	12.5	14.6	66.9	323	44.5	11.5	1060	0.87
370	15300	613	12.5	14.4	61.5	287	41.0	11.4	957	0.89
335	13800	547	12.6	14.3	56.4	252	37.3	11.4	864	0.90
306	12600	492	12.8	14.1	52.2	223	34.0	11.4	789	0.92
279	11500	446	12.9	14.0	48.2	200	31.3	11.4	718	0.93
250	10300	394	13.1	13.9	43.8	174	28.1	11.4	644	0.94
229	9410	360	13.1	13.8	40.4	156	25.9	11.4	588	0.95
207	8490	322	13.2	13.7	36.8	138	23.5	11.3	531	0.97
192	7860	297	13.2	13.7	34.4	126	21.9	11.3	491	0.97
176	7210	273	13.2	13.6	31.7	114	20.3	11.3	450	0.98
WTM 24 x 12 x 457	17900	795	11.3	13.8	75.1	434	52.6	10.3	1120	0.85
414	16200	713	11.4	13.6	69.2	384	48.3	10.3	1010	0.90
375	14600	637	11.5	13.4	63.7	338	44.0	10.3	913	0.92
343	13300	576	11.6	13.3	59.1	304	40.5	10.2	833	0.93
310	12000	513	11.7	13.2	54.2	264	36.7	10.3	752	0.95
280	10800	459	11.8	13.0	49.3	234	33.5	10.2	675	0.97
253	9790	408	12.0	12.9	45.4	206	30.2	10.2	612	0.98
228	8790	366	12.0	12.8	41.2	181	27.5	10.2	550	1.0
207	7990	330	12.1	12.7	37.8	162	25.1	10.2	499	1.0
188	7240	297	12.2	12.6	34.6	143	22.9	10.2	453	1.0
WTM 24 x 9 x 354	13700	727	9.4	10.8	51.5	351	47.3	11.5	857	0.86
319	12300	648	9.5	10.6	47.1	306	42.9	11.5	771	0.88
291	11200	585	9.6	10.5	43.5	273	39.4	11.4	701	0.89
264	10100	528	9.6	10.3	39.8	242	36.2	11.4	633	0.91
239	9180	474	9.7	10.2	36.5	214	32.9	11.4	574	0.92
218	8330	429	9.7	10.1	33.5	191	30.2	11.4	521	0.93
198	7590	386	9.8	10.0	30.9	169	27.5	11.4	475	0.95
181	6910	351	9.8	9.9	28.3	152	25.4	11.3	432	0.96
163	6240	314	9.9	9.8	25.8	133	22.9	11.4	390	0.97
146	5580	281	9.9	9.7	23.3	118	20.8	11.3	348	0.98
128	4880	241	10.1	9.6	20.6	99.5	18.1	11.3	305	0.99
115	4390	217	10.1	9.6	18.6	88.5	16.5	11.3	275	1.0
103	3910	194	10.1	9.5	16.6	78.0	14.8	11.3	245	1.0

Notes:

Where L is the span in feet:

Total allowable uniform load in kips = W_c / L.

End reaction in kips = $W_c / 2L$.

Midspan deflection in inches = $D_c \times L^2 / 1000$.

For unbraced lengths greater than L_c and less than L_u, multiply the constants W_c and D_c by the ratio $22 / F_b$ where F_b = 24 ksi.

F_y = 36 ksi

BEAMS

40″ Wide flange and tailor-made beams
Uniform load constants
for beams laterally supported

I

Shape	W_c	V	L_v	L_c	L_u	R	R_i	N_e	S	D_c
	Kip-ft.	Kip	Ft.	Ft.	Ft.	Kip	Kip	In.	In.^{3}	In./Ft.^{2}
WTM 22 × 12 × 395	14300	647	11.1	13.6	73.1	369	47.3	9.4	895	0.97
357	12900	575	11.2	13.4	67.3	325	42.9	9.3	807	0.99
326	11700	518	11.3	13.3	62.4	288	39.4	9.3	734	1.0
295	10600	466	11.4	13.2	57.3	256	36.2	9.3	663	1.0
269	9650	418	11.5	13.0	52.9	226	32.9	9.3	603	1.0
245	8770	377	11.6	12.9	48.7	202	30.2	9.3	548	1.1
223	8010	339	11.8	12.8	45.1	181	27.5	9.2	501	1.1
204	7300	308	11.8	12.7	41.5	162	25.4	9.3	456	1.1
WTM 22 × 8.5 × 236	8220	468	8.8	9.5	39.2	244	35.1	9.9	514	0.99
216	7500	425	8.8	9.4	36.1	219	32.4	9.9	468	1.0
194	6740	376	9.0	9.3	32.9	191	29.2	9.8	421	1.0
178	6160	344	9.0	9.2	30.3	172	27.0	9.9	385	1.0
161	5570	309	9.0	9.1	27.6	154	24.6	9.8	348	1.1
146	5040	278	9.1	9.0	25.2	136	22.4	9.8	315	1.1
133	4600	249	9.3	9.0	23.2	120	20.3	9.8	287	1.1
118	4050	219	9.2	8.9	20.6	105	18.1	9.8	253	1.1
WTM 21 × 12.25 × 402	15000	648	11.6	14.1	74.7	344	46.7	10.0	937	0.95
364	13500	583	11.6	14.0	68.7	306	42.9	10.0	846	0.97
333	12300	526	11.7	13.9	63.7	271	39.4	10.0	769	0.99
300	11100	466	11.9	13.7	58.3	236	35.6	10.0	692	1.0
275	10100	424	11.9	13.6	54.2	214	32.9	9.9	632	1.0
248	9110	376	12.1	13.5	49.6	186	29.7	9.9	569	1.0
223	8160	336	12.1	13.4	45.0	164	27.0	9.9	510	1.1
201	7380	302	12.2	13.3	41.2	144	24.6	9.9	461	1.1
182	6670	272	12.3	13.2	37.7	129	22.4	9.9	417	1.1
166	6090	243	12.5	13.1	34.8	114	20.3	9.9	380	1.1
WTM 18 × 11 × 311	9980	489	10.2	12.7	68.2	285	41.0	8.5	624	1.1
283	9030	440	10.2	12.6	63.0	253	37.8	8.5	564	1.1
258	8220	396	10.4	12.4	58.4	225	34.6	8.4	514	1.2
234	7450	352	10.6	12.3	54.0	196	31.3	8.5	466	1.2
211	6700	316	10.6	12.2	49.4	174	28.6	8.5	419	1.2
192	6090	281	10.8	12.1	45.6	154	25.9	8.4	380	1.2
175	5510	257	10.7	12.0	41.8	138	24.0	8.4	344	1.2
158	4960	230	10.8	11.9	38.2	123	21.9	8.4	310	1.3
143	4510	205	11.0	11.8	35.2	108	19.7	8.4	282	1.3
130	4090	186	11.0	11.8	32.2	97.2	18.1	8.4	256	1.3

Notes:

Where L is the span in feet:

Total allowable uniform load in kips = W_c / L.

End reaction in kips = $W_c / 2L$.

Midspan deflection in inches = $D_c \times L^2 / 1000$.

For unbraced lengths greater than L_c and less than L_u, multiply the constants W_c and D_c by the ratio $22/F_b$, where F_b = 24 ksi.

BEAMS

F_y = 50 ksi

40″ Wide flange and tailor-made beams
Uniform load constants
for beams laterally supported

Designation	W_c	V	L_c	L_c	L_u	R	R_i	N_s	S	D_i
	Kip-ft.	Kip	Ft.	Ft.	Ft.	Kip	Kip	In.	In.³	In./F
W 40 × 18 × 328	29500	728	20.3	16.0	25.8	226	34.1	18.2	1340	0.8
298	26800	659	20.3	16.0	23.6	202	31.1	18.2	1220	0.8
268	24000	591	20.3	15.9	21.3	178	28.1	18.2	1090	0.8
244	21600	555	19.5	15.9	19.0	163	26.6	18.2	983	0.8
221	18900	549	17.2	15.9	17.2	158	26.6	18.2	858	0.8
192	* 15100	542	13.9	12.8	16.7	153	26.6	18.1	708	0.8
W 40 × 16 × 277	24200	659	18.4	14.2	20.9	202	31.1	18.2	1100	0.8
249	21800	591	18.5	14.1	18.9	178	28.1	18.2	992	0.8
215	18900	507	18.6	14.1	16.4	149	24.4	18.2	858	0.8
199	16900	503	16.8	14.1	15.2	145	24.4	18.2	769	0.8
174	* 13900	497	14.0	11.4	14.8	140	24.4	18.1	636	0.8
W 40 × 12 × 235	19200	659	14.6	10.6	15.7	202	31.1	18.2	874	0.8
211	17300	591	14.6	10.6	14.1	178	28.1	18.2	785	0.8
183	15000	507	14.8	10.6	12.3	149	24.4	18.2	682	0.8
167	13200	502	13.2	10.5	11.0	145	24.4	18.1	599	0.8
149	11300	481	11.7	8.6	10.7	136	23.6	18.1	512	0.8

* W_c and D_i values for this shape based upon allowable stress in accordance with AISC Specification Sec 1.5.1.4.2

Notes:

Dash indicates that R is greater than V.

Where L is the span in feet:

Total allowable uniform load in kips = W_c / L.
End reaction in kips = $W_c / 2L$.
Midspan deflection in inches = $D_i \times L^3 / 1000$.

For unbraced lengths greater than L_u, and less than L_c, multiply the constants W_c and D_i by the ratio 30/F_b where F_b = 33 ksi, except as follows: For W 40 × 18 × 192, F_b = 31.9 ksi; for W 40 × 16 × 174, F_b = 32.8 ksi.

BEAMS

40″ Wide flange and tailor-made beams
Uniform load constants
for beams laterally supported

I

Designation	W_c	V	L_v	L_c	L_u	R	R_i	N_e	S	D_c
	Kip-ft.	Kip	Ft.	Ft.	Ft.	Kip	Kip	In.	In.³	In./Ft.²
WTM 40 × 16 × 655	57000	1719	16.6	15.1	45.6	623	73.9	18.3	2590	0.78
593	51500	1539	16.7	14.9	41.8	545	67.1	18.3	2340	0.79
531	46000	1363	16.9	14.8	37.8	472	60.4	18.3	2090	0.81
480	41600	1221	17.0	14.7	34.4	411	54.7	18.3	1890	0.82
436	37600	1108	17.0	14.5	31.4	367	50.3	18.2	1710	0.83
397	34300	999	17.2	14.4	28.9	326	45.7	18.2	1560	0.83
362	31200	908	17.2	14.3	26.5	289	42.0	18.3	1420	0.84
324	28200	803	17.6	14.2	23.9	251	37.5	18.2	1280	0.85
297	25700	741	17.3	14.2	21.8	229	34.9	18.2	1170	0.86
WTM 40 × 12 × 561	45800	1719	13.3	11.6	35.0	623	73.9	18.3	2080	0.78
520	42200	1579	13.4	11.5	32.7	562	68.6	18.3	1920	0.79
475	38500	1440	13.4	11.3	30.0	503	63.4	18.3	1750	0.80
437	35400	1314	13.5	11.2	27.7	450	58.5	18.3	1610	0.81
396	32100	1183	13.6	11.1	25.4	399	53.2	18.2	1460	0.82
359	29000	1071	13.5	11.0	23.0	350	48.8	18.3	1320	0.83
327	26400	963	13.7	10.9	21.1	310	44.2	18.3	1200	0.84
294	23800	856	13.9	10.8	19.2	271	39.8	18.2	1080	0.85
264	21400	768	13.9	10.7	17.2	239	36.0	18.2	971	0.85
WTM 36 × 16.5 × 848	69700	2139	16.3	16.2	64.5	868	94.5	17.0	3170	0.80
798	65600	1998	16.4	16.1	61.3	798	89.2	16.9	2980	0.81
720	59200	1784	16.6	15.9	56.1	695	81.2	16.9	2690	0.83
650	53200	1595	16.7	15.7	51.2	605	73.9	16.9	2420	0.84
588	48000	1426	16.8	15.6	47.0	529	67.1	16.9	2180	0.86
527	42900	1263	17.0	15.4	42.6	457	60.4	16.8	1950	0.87
485	39400	1162	17.0	15.3	39.4	411	56.3	16.8	1790	0.88
439	35600	1041	17.1	15.2	36.1	360	51.0	16.8	1620	0.89
393	31900	922	17.3	15.1	32.7	312	45.7	16.8	1450	0.90
359	29000	838	17.3	15.0	30.0	278	42.0	16.8	1320	0.91
328	26600	757	17.6	14.9	27.6	249	38.3	16.8	1210	0.92
WTM 36 × 12 × 548	42500	1618	13.1	11.8	38.0	586	73.9	17.5	1930	0.83
508	39400	1485	13.3	11.7	35.6	532	68.6	17.4	1790	0.84
464	35900	1353	13.3	11.6	32.6	475	63.4	17.3	1630	0.85
426	32800	1234	13.3	11.5	30.2	420	58.5	17.4	1490	0.86
387	29700	1110	13.4	11.3	27.7	373	53.2	17.3	1350	0.87
350	26800	1004	13.3	11.2	25.1	329	48.8	17.3	1220	0.88
318	24400	902	13.5	11.1	23.1	290	44.2	17.3	1110	0.89
286	22000	802	13.7	11.0	20.9	253	39.8	17.3	1000	0.90
256	19700	719	13.7	10.9	18.8	221	36.0	17.3	895	0.91
232	17800	646	13.8	10.9	17.1	196	32.6	17.3	809	0.92

Notes:

Where L is the span in feet:

Total allowable uniform load in kips = W_c/L.

End reaction in kips = $W_c/2L$.

Midspan deflection in inches = $D_c \times L^2/1000$.

For unbraced lengths greater than L_c and less than L_u, multiply the constants W_c and D_c by the ratio $30/F_b$, where F_b = 33 ksi.

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BEAMS

F_y = 50 ksi

40″ Wide flange and tailor-made beams
Uniform load constants
for beams laterally supported

Designation	W_c	V	L_v	L_c	L_u	R	R_i	N_e	S	D_c
	Kip-ft.	Kip	Ft.	Ft.	Ft.	Kip	Kip	In.	In.^{3}	In./F
WTM 33 x 15.75 x 619	47700	1516	15.7	15.1	51.9	582	73.9	16.1	2170	0.8
567	43800	1372	16.0	15.0	48.2	513	67.9	16.2	1990	0.9
515	39800	1233	16.1	14.9	44.3	452	61.9	16.1	1810	0.9
468	35900	1119	16.0	14.7	40.5	399	57.0	16.1	1630	0.9
424	32600	1003	16.3	14.6	37.1	353	51.7	16.1	1480	0.9
387	29700	906	16.4	14.5	34.2	313	47.3	16.0	1350	0.9
354	27100	825	16.4	14.4	31.6	277	43.5	16.1	1230	0.9
318	24400	731	16.7	14.3	28.6	241	39.0	16.1	1110	0.9
291	22200	669	16.6	14.2	26.3	218	36.0	16.0	1010	0.9
263	20200	601	16.8	14.2	24.0	192	32.6	16.0	917	0.9
WTM 33 x 11.5 x 520	37600	1516	12.4	11.5	39.3	582	73.9	16.1	1710	0.8
476	34300	1373	12.5	11.3	36.3	513	67.9	16.2	1560	0.9
432	31200	1233	12.6	11.2	33.3	452	61.9	16.1	1420	0.9
398	28600	1136	12.6	11.1	30.8	408	57.8	16.1	1300	0.9
361	26000	1020	12.7	11.0	28.2	358	52.5	16.1	1180	0.9
332	23800	937	12.7	10.9	26.0	323	48.8	16.1	1080	0.9
302	21600	841	12.8	10.8	23.9	288	44.2	16.0	983	0.9
271	19500	747	13.1	10.7	21.7	248	39.8	16.0	884	0.9
243	17400	669	13.0	10.6	19.5	218	36.0	16.0	791	0.9
219	15700	601	13.1	10.5	17.7	192	32.6	16.0	714	0.9
204	14600	556	13.1	10.4	16.5	175	30.4	16.0	662	1.0
187	13400	511	13.1	10.4	15.2	158	28.1	16.0	607	1.0
169	12100	453	13.3	10.3	13.8	140	25.1	16.0	549	1.0
WTM 32 x 12 x 511	34800	1418	12.3	11.6	42.6	619	73.9	14.3	1580	0.9
462	31500	1266	12.4	11.5	39.0	541	67.1	14.3	1430	0.9
418	28400	1134	12.5	11.3	35.8	474	61.1	14.3	1290	0.9
380	25700	1027	12.5	11.2	32.7	422	56.3	14.3	1170	1.0
343	23300	919	12.7	11.1	29.8	370	51.0	14.3	1060	1.0
313	21200	828	12.8	11.0	27.4	328	46.5	14.2	963	1.0
286	19300	752	12.8	10.9	25.2	294	42.7	14.2	878	1.0
256	17300	665	13.0	10.8	22.8	256	38.3	14.2	788	1.0
234	15800	607	13.0	10.7	20.9	229	35.3	14.2	719	1.1

Notes:

Where L is the span in feet:

Total allowable uniform load in kips = W_c / L.
End reaction in kips = $W_c / 2L$.
Midspan deflection in inches = $D_c \times L^2 / 1000$.

For unbraced lengths greater than L and less than L_u, multiply the constants W_c and D_c by the ration $30/F_b$ where F_b = 33 ksi.

BEAMS

40″ Wide flange and tailor-made beams
Uniform load constants
for beams laterally supported

I

Designation	W_c	V	L_v	L_c	L_u	R	R_i	N_e	S	D_c
	Kip-ft.	Kip	Ft.	Ft.	Ft.	Kip	Kip	In.	In.^{3}	In./Ft.^{2}
WTM 30 × 15 × 581	41100	1394	14.7	14.5	54.0	577	73.9	14.6	1870	0.96
526	37000	1244	14.9	14.3	49.6	503	67.1	14.5	1680	0.98
477	33700	1115	15.1	14.2	45.6	443	61.1	14.5	1530	1.0
433	30400	1010	15.1	14.1	41.7	390	56.3	14.5	1380	1.0
391	27500	903	15.2	14.0	38.2	344	51.0	14.5	1250	1.0
357	25100	813	15.4	13.9	35.2	302	46.5	14.5	1140	1.0
326	22700	739	15.4	13.8	32.4	270	42.7	14.5	1030	1.1
292	20400	653	15.6	13.7	29.4	234	38.3	14.4	928	1.1
261	18200	588	15.5	13.6	26.4	207	34.9	14.4	827	1.1
235	16400	520	15.8	13.5	24.0	179	31.1	14.4	746	1.1
WTM 30 × 10.5 × 475	31200	1395	11.2	10.6	39.3	577	73.9	14.6	1420	0.96
435	28400	1262	11.3	10.4	36.4	513	67.9	14.5	1290	0.98
394	25700	1132	11.4	10.3	33.4	449	61.9	14.5	1170	1.0
358	23300	1026	11.4	10.2	30.5	399	57.0	14.5	1060	1.0
323	21000	918	11.4	10.0	27.8	349	51.7	14.5	955	1.0
295	19200	829	11.6	9.9	25.6	310	47.3	14.5	871	1.0
269	17500	754	11.6	9.8	23.6	277	43.5	14.4	793	1.1
246	16000	682	11.7	9.8	21.8	246	39.8	14.5	727	1.1
226	14600	624	11.7	9.7	20.0	223	36.7	14.4	665	1.1
207	13300	574	11.6	9.6	18.3	200	34.1	14.4	605	1.1
185	12000	506	11.9	9.5	16.6	175	30.4	14.4	543	1.1
165	10600	451	11.7	9.5	14.8	152	27.4	14.4	483	1.1
148	9580	399	12.0	9.4	13.4	134	24.4	14.4	436	1.1
WTM 28 × 12 × 485	29700	1266	11.7	11.7	47.8	605	73.9	12.4	1350	1.1
438	26600	1128	11.8	11.5	43.9	529	67.1	12.4	1210	1.1
397	24200	1009	12.0	11.4	40.3	466	61.1	12.4	1100	1.1
360	21800	912	12.0	11.2	36.9	411	56.3	12.4	990	1.1
325	19700	814	12.1	11.1	33.7	360	51.0	12.4	894	1.1
296	17900	732	12.2	11.0	31.0	320	46.5	12.4	815	1.2
270	16300	664	12.3	10.9	28.6	286	42.7	12.3	742	1.2
247	15000	599	12.5	10.8	26.4	256	39.0	12.3	680	1.2
226	13700	547	12.5	10.8	24.3	230	36.0	12.3	621	1.2

Notes:

Where L is the span in feet:

Total allowable uniform load in kips = W_c / L.
End reaction in kips = $W_c / 2L$.
Midspan deflection in inches = $D_c \times L^2 / 1000$.

For unbraced lengths greater than L_c and less than L_u, multiply the constants W_c and D_c by the ratio $30/F_b$, where F_b = 33 ksi.

BEAMS

F_y = 50 ksi

40″ Wide flange and tailor-made beams
Uniform load constants
for beams laterally supported

Designation	W_c	V	L_v	L_c	L_u	R	R_i	N_e	S	I
	Kip-ft.	Kip	Ft.	Ft.	Ft.	Kip	Kip	In.	In.^{3}	In.^{4}/
WTM 27 × 14 × 539	34500	1281	13.5	13.7	55.4	573	73.9	13.1	1570	1
494	31700	1157	13.7	13.5	51.5	509	67.9	13.1	1440	1
448	28600	1037	13.8	13.4	47.4	445	61.9	13.1	1300	1
407	25700	938	13.7	13.3	43.5	395	57.0	13.0	1170	1
368	23300	839	13.9	13.1	39.9	346	51.7	13.0	1060	1
336	21300	756	14.1	13.0	36.8	307	47.3	13.0	970	1
307	19500	687	14.2	12.9	34.0	275	43.5	13.0	884	1
281	17900	621	14.4	12.9	31.5	243	39.8	13.0	811	1
258	16300	568	14.3	12.8	29.1	220	36.7	13.0	742	1
235	14800	522	14.2	12.7	26.6	198	34.1	13.0	674	1
217	13700	472	14.5	12.6	24.8	177	31.1	13.0	624	1
194	12200	422	14.5	12.6	22.3	156	28.1	12.9	556	1
WTM 27 × 10 × 446	26600	1281	10.4	10.2	41.3	573	73.9	13.1	1210	1
407	24400	1157	10.5	10.0	38.2	509	67.9	13.1	1110	1
369	22000	1037	10.6	9.9	35.1	445	61.9	13.1	1000	1
335	19800	938	10.6	9.8	32.1	395	57.0	13.0	902	1
302	17900	839	10.7	9.7	29.3	346	51.7	13.0	815	1
271	16000	742	10.8	9.5	26.6	302	46.5	13.0	729	1
247	14600	673	10.8	9.4	24.4	267	42.7	13.0	662	1
221	13000	594	10.9	9.3	22.1	232	38.3	13.0	593	1
201	11900	542	11.0	9.3	20.2	209	35.3	12.9	540	1
182	10700	484	11.0	9.2	18.5	183	31.9	12.9	488	1
159	9320	422	11.1	9.1	16.1	156	28.1	12.9	424	1
143	8420	373	11.3	9.0	14.7	137	25.1	12.9	383	1
129	7580	337	11.2	9.0	13.3	122	22.9	12.9	345	1
WTM 26 × 12 × 473	27300	1191	11.5	11.7	50.9	605	73.9	11.4	1240	1
427	24600	1060	11.6	11.5	46.8	529	67.1	11.4	1120	1
387	22200	947	11.7	11.4	43.0	462	61.1	11.4	1010	1
351	20000	855	11.7	11.3	39.4	411	56.3	11.4	909	1
317	18100	762	11.9	11.1	36.1	360	51.0	11.4	821	1
289	16500	685	12.0	11.0	33.3	320	46.5	11.4	748	1
264	15000	621	12.1	10.9	30.7	286	42.7	11.3	680	1
241	13700	560	12.2	10.9	28.4	254	39.0	11.4	624	1
221	12500	511	12.2	10.8	26.1	230	36.0	11.3	569	1

Notes:

Where L is the span in feet:

Total allowable uniform load in kips = W_c / L

End reaction in kips = $W_c / 2L$

Midspan deflection in inches = $D_c \times L^2 / 1000$.

For unbraced lengths greater than L_c and less than L_u, multiply the constants W_c and D_c by the ration 30/

where F_b = 33 ksi.

F_y = 50 ksi

BEAMS

40″ Wide flange and tailor-made beams
Uniform load constants
for beams laterally supported

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Designation	W_c	V	L_v	L_c	L_u	R	R_i	N_e	S	D_c
	Kip-ft.	Kip	Ft.	Ft.	Ft.	Kip	Kip	In.	In.^{3}	In./Ft.^{2}
WTM 24 × 12.75 × 492	28400	1168	12.2	12.6	56.2	577	73.9	11.5	1290	1.2
450	25700	1053	12.2	12.5	52.3	513	67.9	11.5	1170	1.2
408	23300	942	12.4	12.4	48.2	449	61.9	11.5	1060	1.2
370	21000	851	12.3	12.2	44.2	399	57.0	11.4	957	1.2
335	19000	760	12.5	12.1	40.6	349	51.7	11.4	864	1.2
306	17400	684	12.7	12.0	37.6	310	47.3	11.4	789	1.3
279	15800	620	12.7	11.9	34.7	277	43.5	11.4	718	1.3
250	14200	548	13.0	11.8	31.5	241	39.0	11.4	644	1.3
229	12900	500	12.9	11.7	29.1	216	36.0	11.4	588	1.3
207	11700	447	13.1	11.7	26.5	192	32.6	11.3	531	1.3
192	10800	413	13.1	11.6	24.7	175	30.4	11.3	491	1.3
176	9910	379	13.1	11.5	22.8	158	28.1	11.3	450	1.4
WTM 24 × 12 × 457	24600	1104	11.1	11.7	54.1	603	73.1	10.3	1120	1.2
414	22200	991	11.2	11.5	49.8	533	67.1	10.3	1010	1.2
375	20100	884	11.4	11.4	45.8	470	61.1	10.3	913	1.3
343	18300	799	11.4	11.3	42.5	422	56.3	10.2	833	1.3
310	16600	712	11.7	11.2	39.0	367	51.0	10.3	752	1.3
280	14900	638	11.7	11.1	35.5	325	46.5	10.2	675	1.3
253	13500	567	11.9	10.9	32.7	286	42.0	10.2	612	1.3
228	12100	508	11.9	10.9	29.7	251	38.3	10.2	550	1.4
207	11000	458	12.0	10.8	27.2	225	34.9	10.2	499	1.4
188	9960	413	12.1	10.7	24.9	199	31.9	10.2	453	1.4
WTM 24 × 9 × 354	18900	1010	9.4	9.1	37.1	488	65.6	11.5	857	1.2
319	17000	900	9.4	9.0	33.9	425	59.6	11.5	771	1.2
291	15400	813	9.5	8.9	31.3	380	54.7	11.4	701	1.2
264	13900	733	9.5	8.8	28.6	336	50.3	11.4	633	1.2
239	12600	658	9.6	8.7	26.3	297	45.7	11.4	574	1.3
218	11500	595	9.7	8.6	24.1	265	42.0	11.4	521	1.3
198	10400	536	9.7	8.5	22.2	234	38.3	11.4	475	1.3
181	9500	488	9.7	8.4	20.4	212	35.3	11.3	432	1.3
163	8580	436	9.8	8.3	18.6	185	31.9	11.4	390	1.3
146	7670	390	9.8	8.3	16.7	164	28.9	11.3	348	1.3
128	6710	335	10.0	8.2	14.8	138	25.1	11.3	305	1.4
115	6040	302	10.0	8.1	13.4	123	22.9	11.3	275	1.4
103	5380	270	10.0	8.1	12.0	108	20.6	11.3	245	1.4

Notes:

Where L is the span in feet:

Total allowable uniform load in kips = W_c/L.

End reaction in kips = $W_c/2L$.

Midspan deflection in inches = $D_c \times L^2/1000$.

For unbraced lengths greater than L_c and less than L_u, multiply the constants W_c and D_c by the ratio $30/F_b$, where F_b = 33 ksi.

BEAMS

F_y = 50 ks

40″ Wide flange and tailor-made beams
Uniform load constants
for beams laterally supported

Designation	W_c	V	L_v	L_c	L_u	R	R_i	N_e	S	D
	Kip-ft.	Kip	Ft.	Ft.	Ft.	Kip	Kip	In.	In.^{3}	In./F
WTM 22 x 12 x395	19700	898	11.0	11.5	52.6	513	65.6	9.4	895	1.
357	17800	799	11.1	11.4	48.4	451	59.6	9.3	807	1.
326	16200	720	11.3	11.3	44.9	400	54.7	9.3	734	1.
295	14600	648	11.3	11.2	41.2	355	50.3	9.3	663	1.
269	13300	580	11.5	11.1	38.1	315	45.7	9.3	603	1.
245	12100	524	11.5	11.0	35.1	281	42.0	9.3	548	1.
223	11000	471	11.7	10.9	32.5	251	38.3	9.2	501	1.
204	10000	428	11.7	10.8	29.9	225	35.3	9.3	456	1.
WTM 22 x 8.5 x 236	11300	649	8.7	8.1	28.2	338	48.8	9.9	514	1.
216	10300	590	8.7	8.0	26.0	304	45.0	9.9	468	1.
194	9260	523	8.9	7.9	23.7	266	40.5	9.8	421	1.
178	8470	478	8.9	7.8	21.8	239	37.5	9.9	385	1.
161	7660	429	8.9	7.7	19.9	213	34.1	9.8	348	1.
146	6920	386	9.0	7.7	18.2	189	31.1	9.8	315	1.
133	6320	345	9.2	7.6	16.7	167	28.1	9.8	287	1.
118	5570	304	9.2	7.5	14.8	146	25.1	9.8	253	1.
WTM 21 x 12.25 x 402	20600	900	11.4	12.0	53.8	478	64.9	10.0	937	1.
364	18600	810	11.5	11.9	49.5	425	59.6	10.0	846	1.
333	16900	730	11.6	11.8	45.9	376	54.7	10.0	769	1.
300	15200	648	11.7	11.6	42.0	328	49.5	10.0	692	1.
275	13900	589	11.8	11.5	39.0	297	45.7	9.9	632	1.
248	12500	522	12.0	11.4	35.7	258	41.3	9.9	569	1.
223	11200	467	12.0	11.4	32.4	227	37.5	9.9	510	1.
201	10100	419	12.0	11.3	29.7	200	34.1	9.9	461	1.
182	9170	377	12.2	11.2	27.1	179	31.1	9.9	417	1.
166	8370	337	12.4	11.1	25.0	158	28.1	9.9	380	1.
WTM 18 x 11 x311	13700	679	10.1	10.8	49.1	395	57.0	8.5	624	1.
283	12400	612	10.1	10.6	45.3	351	52.5	8.5	564	1.
258	11300	549	10.3	10.5	42.0	312	48.0	8.4	514	1.
234	10200	489	10.4	10.4	38.9	272	43.5	8.5	466	1.
211	9210	438	10.5	10.3	35.6	241	39.8	8.5	419	1.
192	8370	391	10.7	10.3	32.8	214	36.0	8.4	380	1.
175	7580	357	10.6	10.2	30.1	192	33.4	8.4	344	1.
158	6820	319	10.7	10.1	27.5	171	30.4	8.4	310	1.
143	6210	285	10.9	10.0	25.3	151	27.4	8.4	282	1.
130	5630	258	10.9	10.0	23.2	135	25.1	8.4	256	1.

Notes:

Where L is the span in feet:

Total allowable uniform load in kips = W_c / L.

End reaction in kips = $W_c / 2L$.

Midspan deflection in inches = $D_c \times L^2 / 1000$.

For unbraced lengths greater than L_c and less than L_u, multiply the constants W_c and D_c by the ratio 30/F_b where F_b = 33 ksi.

F_y = 50 ksi

	N_e	S	D_c
	in.	in.^{3}	in./Ft
6	9.4	895	1.3
6	9.3	807	1.4
7	9.3	734	1.4
8	9.3	663	1.4
7	9.3	603	1.4
0	9.3	548	1.5
1	9.2	501	1.5
1	9.3	456	1.5
8	9.9	514	1.4
0	9.9	468	1.4
5	9.8	421	1.4
6	9.9	385	1.4
1	9.8	348	1.4
1	9.8	315	1.5
1	9.8	287	1.5
1	9.8	253	1.5
9	10.0	937	1.3
6	10.0	846	1.3
7	10.0	769	1.4
5	10.0	692	1.4
7	9.9	632	1.4
3	9.9	569	1.4
5	9.9	510	1.5
1	9.9	461	1.5
1	9.9	417	1.5
1	9.9	380	1.5
0	8.5	624	1.5
5	8.5	564	1.6
0	8.4	514	1.6
5	8.5	466	1.6
8	8.5	419	1.7
0	8.4	380	1.7
4	8.4	344	1.7
4	8.4	310	1.7
4	8.4	282	1.8
1	8.4	256	1.8

V_c and D_c by the ratio 30/F_y

Notes

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